The Investigation of Suicide in Malta

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Statement

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Dedication

for all the persons who died by suicide and

for those who have lost loved ones to suicide whose stories remain untold

A small word of appreciation to all my family, to mum and dad for their determination and hard work, to my wife Michelle for her silent patience, to my colleagues in the Force, to Laura Hammond and Susie Kola Palmer who guided me in this work, to Tammy Walker who for some time participated in this project, to Professor Liberato Camilleri for his support, to others who in any way assisted and to Zakumi, my faithful companion and his brother Buster who always amuse us.

Abstract

Suicide is a complex human behaviour and a public health problem that is not inevitable but preventable. The study of suicide has always been geared into gaining insight and knowledge of the subject with the primary purpose of improving prevention capabilities. This study aimed to provide an overview of the nature and characteristics of suicide in Malta by examining police reports of all the 359 recorded cases of suicide within the fifteen-year period between 2003 and 2017 and to provide the police with a practical data collection tool for use in future suicide investigations.

A review of literature regarding the risk and protective factors and other variables which might affect suicide was made prior to the review of the police reports. These were classified into four categories: demographic variables including gender, ethnicity, ties to family and friends, employment, education, skills and physical disabilities and ailments; variables related to history of suicide and mental illness including if the person attempted suicide before, if any family member or close friends ever attempted or died by suicide or suffered from mental health illness like depression and bi-polar disorder; variables related to suicidal behaviour including self-harm, ideation, desire to attempt suicide, planning for suicide, having a favourable attitude and attraction to death and preparing for actual suicide; and life events which affect a person significantly including child abuse, trauma or loss of function, financial difficulties, loss of employment, marriage or a significant relationship breakdown, loss of child custody, death of a loved one, life-threatening illnesses, legal or criminal problems or other actions that significantly mark a person for life.

Data have shown that 87.2% of suicides were males, with the highest percentage aged between 46 and 60 years. The rate of suicide in the region of Gozo is lower than in the region of Malta and the difference is statistically significant. In the region of Malta, the mean rate of suicide is higher in the Northern Harbour district when compared to the other districts. Hanging was the most common method of suicide with just over half of the recorded suicides. A gender difference was however noted as jumping off heights was noted to be the commonest method of suicide for females. A slight increase in the rate of suicide was noted in March and August reflecting two peaks in suicide numbers in spring and summer. The home was the chosen location of suicide for most suicides followed by garages. The bastions were the preferred location for persons choosing to jump to death, especially in the Southern Harbour district where most of the bastions are located. Persons from the Northern District who died by jumping tended to do so from the Mosta bridge, located in the same district.

It was noted that the police collected about 30% of the data listed in the content analysis in the literature review. Although some differences between police districts were observed, this could not be empirically tested due to low frequency of annotation. To facilitate a more thorough collection of relevant data pertaining to suicide in police investigations, a standardised data collection tool based on the review of literature and the 359 police reports was developed.

The Investigative Support Tool is a 61 variable form based on the psychological autopsy technique reflecting the four categories of data indicated earlier. It broadens the investigative strength of the psychological autopsy by focusing on the analytical contribution the police can make to psychological and suicide studies. It has an integrational approach as variables have been adopted from different areas and the standard data it produces can increase interoperability and be utilised by various professions.

The adoption of the Investigative Support Tool would minimise misclassification and underreporting of suicide, and could be used as a platform from which a much-needed national suicide prevention programme be launched. The use of the Investigative Support Tool would enhance the data collection capacity of the police, strengthen data reliability for investigations and ultimately provide standard comparable data, bringing the police in Malta to the forefront in data collection regarding suicide.

This present study is the first of its nature in reviewing police investigations in Malta and the first study of suicide in Malta in more than forty years. It constitutes one of the most thorough reviews of suicide in Malta to date and as such is an important step in any evidence-based effort in suicide prevention particularly for the assessment and prioritisation of required interventions in health promotion, social assistance and the medical field. The study could serve as an awareness platform and reference point on the general discussion of suicide in Malta as it exposes an empirical picture of the current situation. It also has the potential of producing a ripple effect on other agencies and departments to collect required data, prioritise required training and produce standard operating procedures including in the fields of mental health care and medical assistance.

The study is limited by the use of pre-collected data which the police referred to for the purpose of their investigations. This is manifested in the limited and minimal collection of data regarding the transition from suicide ideation to suicide. The study is also limited by the fact that the police do not use a standard operating procedure in their investigation therefore what data is collected and how it is classified depends upon every officer's level of detail and to a certain extent improvisation. Reports by the police are not classified in standard International Classification of Diseases. These may impinge on the ultimate validity of the information. The adoption of the Investigative Support Tool will counter this deficiency as it generates more data on various aspects, diversifying the information base and providing suicidology with rich data from untapped police sources. This supports the idea that suicide is not the exclusive domain of the medical professions but rather should draw from various fields of study including policing.

The results from this study should have a positive effect on police operations by promoting an evidence-based approach which could be diversified into other areas of investigations like structured interviews with family and friends and in areas where a descriptive profile of an individual is required like in missing persons investigations. By collecting more reliable and robust data, which could even be used by other professions, the police would be at the forefront in raising awareness and contributing to the ever-required suicide prevention programmes. The study also contributes through its Public Health approach and has practical implications beyond the police by providing healthcare

professions data which could be utilised in suicide risk assessments, in tailoring and targeting interventions and in health promotion settings amongst others.

Various recommendations are made including a further study to establish the reasons why suicide in Gozo is significantly lower than in Malta and to study the effects of family, close communities, overcrowding and dense population are having. The study also calls for the police to review all cases of accidents, missing persons and drug-overdoses to reduce misclassifications. It is also recommended to train the police in suicide awareness, to increase focused patrols and to fix information material in suicide hot spots. It is also recommended to set up an interagency review of suicide cases to oversee the collection of complete information in every suicide case.

The facts of this study are humbling but motivating. Although this is only a step in a long journey, persistent effort into researching suicide would no doubt improve our understanding of the subject and ultimately lead to better prevention.

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Chapter 1 - Introduction

Suicide is a complex issue. The study of suicidal behaviour has recently garnered much attention all over the world. Suicide is a subject that requires an integrated approach to understand the delicate balance between so many factors affecting the process. Although suicide exists in all corners of the world, it does not necessarily present itself in the same way. It is difficult to understand suicide. Research has, over decades, developed increasingly complex taxonomies and typologies of suicide which will be further discussed below.

A Definition of Suicide

Suicide has been described by Durkheim (1951) as any death coming directly or indirectly from any act of commission or omission of the deceased who knowingly acts to achieve his or her own death. More commonly, it has been defined "as an act of intentionally causing one's own death or the act of taking one's life" (Reber, 1995), as a "self-initiated, intentional death" (Ivanoff, 1989) and as "ending one's own life" (Nock et al., 2008). Suicide has been defined as "Death arising from an act inflicted upon oneself with the intention to kill oneself" (Rosenberg et al., 1988).

Suicide also has a psychosocial context of its own and is more complex than the meaning of "killing oneself" as the origin from latin *suīcīdium* may suggest. (Latin *suī* of oneself + *cīdium*, from *caedere* to kill) Edwin Schneidman defined the complexity of suicide as "the conscious act of self-induced annihilation, best understood as a multi-dimensional malaise in a needful individual who defines an issue for which the act is perceived as the best solution" (Shneidman, 1993, p. 4). In a more recent study, suicide was defined as "death caused by self-directed injurious behaviour with any intent to die as a result of the behaviour" (Crosby, Ortega & Melansson, 2011, p. 23). Both of these definitions indicate the multi-dimensionality of suicide as both an internal state - that is intention, and an external act - that is the act of completing one's own death (Douglas, 1967). This multi-dimensionality may be a cause of further definitional

complexity as eeach dimension may manifest variables and consequently compound the complexity of factors affecting suicide (Shneidman, 1977).

Even though in many ways similar, these diverse definitions of suicide have been a source of inconsistency, both in research and in medical practice. The harmonisation of nomenclature, particularly suitable for medical classification, has been sought for a long time (Silverman, 2006). In the 1970's the first major attempt to formulate a standard definition of suicide and related behaviours was spearheaded by Aaron Beck, through his chairmanship of the National Institute of Mental Health's Committee on Classification and Nomenclature in the United States. The urgent need for a standardised nomenclature was highlighted (Beck et al., 1972 as quoted in Beck, Kovacs & Weizman, 1979). There are many benefits of having standard nomenclature amongst which are facilitating communication between professions, increasing interoperability and enabling data collection by different professions to be shared.

The separation of suicidal occurrences into three classes was proposed: suicide, suicide attempt and suicidal ideas. Each incident was further categorised by sub-classifications ranging from the consideration of the potential lethality of the suicidal action to using clinical judgement and assessing the type of method used in order to gauge the level of intent (Beck & Greenberg, 1971).

Building on from these studies and the interest they generated, the World Health Organisation defined suicide as "an act with a fatal outcome, which the deceased, knowing or expecting a potentially fatal outcome, has initiated and carried out with the purpose of bringing about wanted changes" (De Leo, Burgis, Bertolote, Kerkhof, & Bille-Brahe, 2006, p. 8).

The various definitions of suicide presented above can be summend up into one single sentence: suicide is a *death which is intended to terminate one's own life.* Three elements stand out in this definition: the first element is *death; the second element is the intention to die and the third element is the termination of one's own life*. The quandary with such elements is that whilst two of the elements are objective, that is a *death* as a *termination of one's own life*, the third element - that is the *intention* to die - is highly subjective, and cannot be assuredly nor completely known as the *intender* is always the deceased

person. The importance of intent is in the fact that it is the distinguishing factor between suicide and other deaths (De Leo, Burgis, Bertolote, Kerkhof & Bille-Brahe, 2006).

The intention of the person who died by suicide is always a challenge to establish and very difficult to ascertain. A suicide note may be indicative of one's intention even though leaving a suicide note or not is a choice the person makes and that in itself may be indicative of emotional bias which renders the suicide note subjective. In other cases, no suicide note is left and therefore the only way the intention of dying may be drawn is from the subjective retrospective interviewing of the family or close collaborators of the deceased. This is more subjective and based on opinion rather than indisputable fact (Maris, Berman & Silverman, 2000).

Intention cannot be determined by examining the body of a person who has died by suicide. A coroner, in his pursuit of finding the cause of death, would pronounce "what lesions the patient died *with* not what he died *from*" (Weisman, 1967). Intention, therefore, has to be studied through the lens of different fields of knowledge, including psychology, psychiatry and other human sciences. However, this may have the effect of creating more inconsistencies regarding the definition of "intent" (Mayo, 1992), and increases the need to have a standardised nomenclature for a smooth cross-reference between professionals from different fields (De Leo et al., 2006; Silverman, 2006).

Intention has been described as one of the components of human behaviour based on a mental state which includes one's own beliefs and desires (Perner, 1991). It is therefore a naturally subjective psychological process which affects the very core of human behaviour. Intention as a mental mechanism explains the individuality of every human and distinguishes every person's desires in an attempt to achieve desired goals (Tomasello, Carpenter, Call, Behne, & Moll, 2005). This is most commonly driven by the beliefs every person holds imperative. Intention can therefore be defined as a function of humanity which directs actions to accomplish desired goals based on every individual's belief that those same desired actions would actually satisfy a desire (Malle & Knobe, 1997).

Such subjectivity is inevitably affected by various internal and external factors. As much as understanding human intention, it is pivotal to understand the context in which intention develops particularly the personal and the social complexes. Humans are individual beings but also social animals, and thus interpret behaviour by conceptualising how each person differs from others by assessing their behaviour and distinguishing their intentions (Gálvez & Gaffal, 2017). It is therefore a key tool in understanding and predicting the future actions of peers and aids in being part of that same community by identifying oneself with the common intentions of others (Jenkins & Greenbuam, 1991).

The study of suicide and what elements constitute the subject is an ever- evolving area of research. The development of a comprehensive or overarching definition of suicide is likely to never be achieved. As research into suicide takes an interactive approach, it is more likely for a definition to be revised. With further accumulation of data regarding the subject, a revised definition of suicide is likely to be empirically based, with better internal reliability and validity (Posner, Brodsky, Yershova, Buchanan & Mann, 2014).

The Prevalence of Suicide

Suicide is an international phenomenon. The World Health Organisation (WHO) estimates that approximately 800,000 suicides are reported annually around the globe. It is projected that the numbers could rise to over 1.5 million by the end of the current year, 2020 (WHO, 2013). Globally, suicide is preceded only by motor vehicle accidents as the leading cause of premature death in young adults aged 15 to 29 years (WHO, 2015).

The prevalence of reported suicide in 2016, as in previous years, was not uniform across the world. Rates per 100,000 inhabitants vary from the highest in Lithuania (31.9 per 100,000 inhabitants) to the lowest in various Caribbean island states including Antigua and Barbuda (0.5 per 100,000 inhabitants) (WHO, 2018). From the data collected by the WHO, it transpires that differences in number of suicides exist across world regions. Whereas the Caribbean countries may have the lowest recorded rates of

suicide (<5 per 100,000 inhabitants), Eastern Europe and the former Soviet bloc have the highest recorded rates (>15 per 100,000 inhabitants) (Bachmann, 2018). Such global statistics, however, should always be questioned, for under-reporting and misclassification as the data collection capacity of nations is not even (Bakst, Braun, Zucker, Amitai & Shohat, (2016).

Globally there are more males who die by suicide, even though there are more females who attempt suicide (Zhang et al., 2005). China and Bangladesh are the only known exceptions to this. The male to female ratio varies between nations, and there seems to be a trend, especially amongst advanced nations, for higher female suicide rates especially by younger female adults (Ruch et al., 2019).

Socio-economic factors have an effect on the prevalence of suicide; 78% of suicides were in low- and medium- income countries (WHO, 2018). This is also reflected in higher suicide rates within minority groups like refugees and asylum seekers (Kalt, Hossein, Kiss & Zimmerman, 2013) and homeless people (Barak, Cohen & Aizenberg, 2004), but can also be affected by religion and culture (Colucci, 2006).

The greatest impact on suicidal behaviour and suicide in general comes from mental health issues. It is reported that 90% of persons who died by suicide had some form of mental health issue (Bertolote, Fleischmann, De Leo, & Wasserman, 2004). The prevalence of suicide within persons with mental health issues is as much as ten times higher than for the general population (Bertolote et al., 2004; Röcker & Bachmann, 2015).

Various factors can have an impact on suicide rates. Some may be temporary but others are long term. As complex as suicide is, many times, co-morbidity exists. Statistics, which are key to any decisions in suicidology, are thus to be read through a

holistic approach as any risk or protective factor can have different effects on the prevalence of suicide.

The Investigation of Suicide

In most, if not all, jurisdictions around the world, the discovery of a human body is followed by a legal investigation (Swanson, Chamelin & Territo, 2003). The aim of such an investigation is generally to establish the timing, manner and cause of death. More or less, it follows the maxim that the cause of a sudden death is natural; the cause of suicide is self-inflicted, the cause of homicide is induced by a third party and the cause of accident is an unnatural unplanned event (Di Maio, 2003).

An investigation happens in order to establish facts (Bennett & Hess, 2004). At the initial stages of a death investigation, an assessment of the *locus* and the body are conducted. At this initial stage, irrelevant of what kind of death would resut later, the *locus* is considered as a crime scene. Initial investigations are conducted to establish the nature of the incident, based, at that stage, on *prima facie* environmental cues and possible witnesses. The initial assessment is thus crucial as it sets the basis for what kind of investigation is pursued. In most cases, the police could *ab initio* determine the manner of death particularly if it is an accident, a homicide or a suicide (Ambade, Godbole & Kukde, 2007), and lead the investigation as such. If the manner of death is determined to be natural, the police would normally cease their investigations, whilst in undetermined deaths the police will usually treat the case as suspicious (Police Service of Scotland, 2018).

The investigation of death in Malta is regulated by Chapter 9 of the Laws of Malta – The Criminal Code. An inquest on the dead body is required "in cases of sudden or violent or suspicious death or of death whereof the cause is unknown" (Laws of Malta – Chapter 9, Article 551). The inquest in Malta is carried out by a Magistrate who ordinarily presides over the lower courts. In the capacity of an Inquiring Magistrate, he or she leads the investigation independently of, but in collaboration with the police. The purpose of the Magisterial inquest is to collect material evidence to establish the cause of death. An inquest does not apportion blame nor guilt, even though in the concluding remarks an inquiring Magistrate may suggest that there is enough *prima facie* evidence for someone to be charged before a court of law. This is very similar to what happens in the United

Kingdom (HMSO, 2003) and various other countries, including the United States (Holder, Robinson & Laub, 2011). Although there are operational and procedural differences between jurisdictions, invariably the police act on behalf of the state in regulating death investigations and the collection of evidence in support of later claims (Maloney, 2018).

In cases of suicide, a medico-legal expert together with a pathologist are nominated to assist the Inquiring Magistrate. Whilst the medico-legal expert attends to the location of the suicide and records it, the pathologist performs an autopsy. A toxicologist and other scientific experts may be nominated where relevant (Laws of Malta – Chapter 9, Article 548).

Initial investigations in cases of suspected suicide are focused on gathering as much information as possible to rule out the involvement of third parties. Two avenues are explored; one to seek that there are no indications of foul play and that the incident is actually a self-induced death, and the second to prove that the deceased received no assistance to die by suicide as there is a degree of criminal liability in assisting a person to commit suicide (Laws of Malta – Chapter 9, Article 213). Establishing both elements is essential, particularly if the scene of death is abstruse. Although any method of suicide can be simulated in the commission of a homicide, some important physical evidence differentiates suicides from homicides. For example, in a presumed gunshot suicide, the location of the entry wound vis a vis the exit wound, if any, when compared to blood spatter could indicate if the person shot him or herself or was shot at by someone else. The entry wound itself may show contact burns indicating a high proximity of the gun to the wound, which is more normal in suicide than in homicide. Other examples for different methods can be given; in hanging, most often, the deceased is not fully suspended and is rarely found with a broken neck. Some positions may arouse suspicion, but understanding the dynamics of each suicide is important. For example, finding a hanged person in a sitting position may arouse suspicion that the person was first rendered unconscious then hanged to simulate a suicide. However, such a position may be explained by the fact that most hanging suicides are the result of a simple action by the deceased to cut off the oxygen from the brain. When

unconsciousness occurs, the weight of the body pressures the noose and cutting all oxygen supply to the brain, resukting in death within minutes. The eyes and the mouth and tongue of the deceased can give an investigator clues about the suicide too as they are normally different from those noted in persons who did not die by hanging (Swanson, Chamelin & Territo, 2003).

When it is established to a degree of probability that death was self-induced, then the focus of the investigation shifts to establishing the suicidal intent of the deceased. This would corroborate what is noted at the location of the suicide. If a suicide note is found at the location of the suicide, elsewhere or in other forms like uploaded social media posts, it would first have to be authenticated (Koehler, 2007); for example, the handwriting is checked with some other examples of handwritten notes known of the deceased. A suicide note or testimony can galvanise evidence from the location of the suicide with the deceased's intention to die particularly if it is further corroborated by knowledge of this intent by the family. Interviews with other witnesses or close friends and neighbours could possibly extract further information about the deceased and their intention of dying (Maloney, 2018).

Pathologists provide written reports in the Magisterial inquest, and a certificate of death which includes the cause of death. The cause of death is a medical verdict which has a heavy bearing in support or otherwise of the manner of death. Where this is not as obvious, further examinations are conducted (D'Ovidio, Rosato & Carnevale, 2017). For example; in hanging, a verdict that the person died by asphyxia due to hanging is a clear indication of suicide. A pathologist's annotation, however, that a fractured hyoid bone was noted would arouse suspicion as hyoid bone fracture is far more common in strangulation than in hanging (Sharma, Harish, Sharma, Sharma & Singh, 2008). A deeper examination of the knot, the position of the corpse and other environmental circumstances would then be conducted in the second scenario as to arrive at a conclusive decision (D'Ovidio et al, 2017).

The examination of the location of the suicide and other forensic examinations may lead the police to establish the manner of death but rarely offer an insight into the intention of the deceased except in cases where an authenticated suicide note is left (Maloney,

2018). To establish intent, the police, conduct interviews with family members, friends, colleagues, neighbours and other relevant parties. Many times, this takes the form of a psychological autopsy. The outcome usually compliments what is recorded on the scene and established by the autopsy. Moreover, these facts could be further corroborated by health care professionals including psychiatrists and family doctors who may have been in contact with the deceased (Bennett & Hess, 2004).

Investigations are however, sometimes not as straightforward as pictured above. When it comes to the reconstruction of the deceased's behaviour, many times the family believes that its members could answer any question about the deceased's like and their activities. This is not always the case, and investigative experience has shown that in general, people are growing more aloof and leading a secretive life more than before (Brandl, 2002). Moreover, research has shown that since the bereaved family shared life experiences with the deceased, their reconstruction of the behaviour and actions of the deceased prior to suicide may be biased in many ways and dampened by feelings of denial, betrayal, anger, guilt, shame and similar emotions (Jordan, 2001; Sands & Tennant, 2010). It may also be the case that families shift the blame on others outside their circle to find explanations and blame work colleagues, lovers and friends (Dieserud, Leenars & Dyregrov, 2015). In this regard, the police would have to rely on any obtainable information in determining whether the intent to die by suicide is clear enough for the investigation to be classified as suicide. An investigation is formally classified as suicide upon a declaration by the Inquiring Magistrate that no third party was involved and the investigated death is declared.

Conclusion

An investigation is an inquiry to establish facts. It is the observation and reconstruction of facts by systematic examination of evidence (Bennett & Hess, 2004). In its formal nature, it is most often guided by legal documents and laws. In its practical form, it is governed by our quest to know what is yet hidden from us. The investigation of suicide satisfies both roles; it is a legal investigation into the death of a member of the

community, and it is a practical investigation because we want to know how and why a suicide occurred, not out of curiosity but in our quest to prevent others from doing it.

Views on suicide are influenced by broad philosophical themes associated with humanity's own existence. Different cultures see suicide through different lenses, and whilst it is no longer an offence in most western countries it is still viewed as an offence against God in the Abrahamic religions. More awareness that suicide is associated with mental health issues and with our way of life has brought the subject further up the agenda.

Chapter 2 - Theoretical Models of Suicide

Theory is distinguished from practice but the two are not opposites even though theorists have been labelled as impractical amateurs who are unable to do anything (Maris, Berman & Silverman, 2000). This strong view preceded today's inclination that rather than following one theory in an unswerving manner, one embraces similar views which form an approach to a subject rather than a rigid theory. However, theory remains something that drives research and serves as a guide as to what one looks for. In anything we think of, we "theorise". Our unwritten theories often influence us as to what we devote our attention to and to what we disregard making theories practical (Schneidman, 1993). Theory is, in a way a plan which systemises loose ideas. An approach is the angle from which theory is taken, improved and built upon in way enriched and enlarged, making it broader in the process. This postulates that even though we can distinguish between the different theories and approaches, these are neither cast in stone nor inflexible and many times intertwine. A lack of integration between theories may have created a research environment where old theories are seen as inhibitors to the development of new ones. It may also have enhanced the idea of research without the pursuit of a theory (Gunn & Lester, 2014). Recently however, classical theories of suicide have been revisited and new theories proposed (Wray, Colen & Pescosolido, 2011). What follows is a short review of the approaches to suicide within the framework of different theories. Their importance to this research is that different theories give different insights to the subject. In any investigation, one cannot choose an avenue to explore until all other possibilities are exhausted. In the same way, different theories provide different perpectives and therefore more avenues to follow in any investigation.

Durkheim and the Sociological Theories

Empirical research on suicide was born from a sociological approach. This has been synonymous with Emile Durkheim's work (Bille-Brahe, 2000) and has since developed

around a few theories which mostly evolved independently of each other (Kleiman, Law & Anestis, 2014).

The first of the seminal theories of suicide was proposed by Emile Durkheim in 1897. As a sociological theory, Durkheim's proposition is that suicidal behaviour manifests itself in four different categories forming two sets of behaviours. The first set of behaviours are fraternal or what is referred to as *social integration.* Durkheim suggests that where there are extremes, both low and high, of social integration, there are higher numbers of suicides. Social integration comes about by having socially stable relationships which sustain members of that society to participate fully in communal behaviour. *Egoistic suicide* usually happens when a person feels disconnected and isolated from society and destroys oneself because of feelings that there is no place for oneself within the society one lives in. On the other hand, *altruistic suicide* comes when members of the same society become too intimate in their integration and there would be feelings of lack of individuality.

The second set of behaviours are regulatory or as Durkheim describe them *social regulation*. This happens when there is control over the emotive and motivational aspect of human beings living in a society. Where this control is high, *fatalistic suicide* may occur. This is the result of over-regulation and to a certain degree, oppression within the family and over regulation in general. On the other end of the spectrum is *anomic suicide* which occurs as result of a sudden change in the living pattern of an individual which destabilises the social equilibrium.

The arrangement of Durkheim's theory is based on the function of social relationships. Its robustness is the emphasis on social rather than biological factors. Societies with moderate social integration and regulation have the lowest number of suicides according to Durkheim. This is because people feel neither alienated nor frustrated.

Durkheim theory has been criticised as over-simplistic, adjustable and too generalised (Lester, 2014). Johnson (1965), considered that Durkheim did not document enough examples to sustain his claims of suicide occurrence within the four proposed categories of his theory. Apart from this, Johnson (1965) criticised Durkheim for relying on primitive societies and generalising his finding to the advanced Western. A parallel

argument was made with regards to both dimension of social integration and social regulation. Durkheim's assertions that suicide occurred less in Catholic than in Protestant communities was only based on Germanic societies and thus naturally could not be generalised to all the world as various factors which affect suicide could not be completely attributed to religion (Pope & Danigelis, 1981, Bankston, Allen & Cunnigham, 1983). Johnson (1965) concluded that both social integration and social regulation were empirically related and could thus be reduced to one concept of societal integration (Johnson, 1965).

Whitney Pope (1976) pronounced herself on Durkheim's theory argueing that "…if *Suicide* is evaluated for its success in explaining suicide (or for the empirical adequacy of Durkheim's theory relative to competing, non-social explanations of suicide), it must be judged a failure." (p. 202). More recent, Durkheim's theory has been criticised by Nolan, Triplett and Mc Donough (2010) as being unable to provide answers. The authors argued that Durkheim's theory has been tested over and over again and always found to be "wanting" (p. 292)

Far from the extremes of Pope (1976) and Nolan et al. (2010), Durkheim's theory remains as inspiring today as it was a century ago. It still provides the basis of many of the recent sociological research on suicide. Bearman (1991) argues that society should have an internal insight derived from its dual role of interpersonal and social networks in response to suicide. This would account for Durkheim's collective responsibility notion without going into individual and personal motivators for suicide.

Pescosolido and Georgianna (1989) based their research on Durkheim's proposition that religion is a protective factor to suicide but added that this should not be limited to religion as one factor but to religion as a mover of social and historical contexts. They contend that certain religious affiliations (Catholicism and Evangelical-Protestantism) are directly associated with a larger social network and tend to have lower suicide rates.

More recent, even though they criticise Durkheim's lack of sound empirical testing and an over-reliance on religious-social factors, Abrutyn and Mueller (2016) argued that social integration and regulation remains important protective factors of suicide and should be further studied to establish at which level these protective factors turn into

risk factors. Abrutyn and Mueller (2018) went a step further and argued in favour of culturalism being given more importance for a better understanding of suicide's social origins. This is hardly new as Douglas (1967), in his criticism of Durkheim had already highlighted the importance of the cultural heritage of each individual and society at large. Douglas' view on the importance of culture in the context of suicide research is resonated by Barbagli (2015) and to a certain extent also found in Abrutytn and Mueller (2016).

Cross-National Sociological Studies on Suicide

Durkheim's theoretical framework has been employed in various forms of studies on suicide. Anthropologist Clyde Kluckhohn (1962) argued that culture has universal constituents built around natural necessities which can be compared. A dimension frequently used as a measure to quantify and compare culture and its effects on suicide is the economic development or nations (Zhang, 1998). Research has however shown that the importance given to economic factors was exaggerated as there are many cultural values which affect suicide rates (Douglas, 1967). Some even argue that a quantification or a comparison of cultural values cannot be made (Hjelmeland, 2010).

To counter for the differences in culture between regions and nations in different parts of the world, factor analysis had already been proposed by Raymond Cattell in 1949. However, such comparative research framework was likely to produce anomalies in results as it is not based on universal constructs of culture. Azibo (1988) contended that for such framework to succeed, it should be equated on single variables where divergent results on suicidal attributions can be noted and as such can be taken to underscore culture-specific attributions.

The work by Hofstede's (1980) and his research on data collected from IBM workers across 50 countries in the 1960's and 1970's was based on the same concept later defined by Azibo (1988). Early into his studies, Hofstede realised that patterns of correlation at national level could be different from those at personal level and that both required a different interpretation. Hofstede confirmed this when he administered

some the same questions to different persons from 30 countries in a study unrelated to the study undertaken at IBM (Hofstede, 2011). Based on the work of Inkeles and Levinson (1969, as quoted in Hofstede, 2011) Hofstede (1980) proposed four comparative cultural dimensions:

i. power distance: how human inequality is dealt with
ii. uncertainty avoidance: the level of stress an unknown feature creates in a society
iii. individualism vs collectivism: the function and integration of persons into groups
iv. masculinity vs femininity: the emotional divide between men and women

"A dimension is an aspect of a culture that can be measured relative to other cultures" (Hofstede, 2011, p.7). Later a fifth and sixth dimensions were added:

v. long-term versus short-term orientation: the focus of individual effort towards the past, present or future (Hofstede& Bond, 1988)
vi. indulgence versus restraint: immoderation versus control of human aspirations in relishing life (Hofstede, Hofstede & Minkov 2010).

Similar work was carried out by Shalom Schwartz as part of his sociological theory of human values. In his studies on educators and students in 70 countries, Schwartz (1994, 2006) developed and proposed seven cross-cultural orientations:

i. intellectual autonomy: the ability to create and have freedom of thought
ii. affective autonomy: to have personal gratification and variability in life
iii. embeddedness: the need for status quo out of fear of disrupting traditional order
iv. egalitarianism: all people are morally equal irrespective of their class or role
v. hierarchy: traditionally ascribed roles defining the distribution of power and roles in a community
vi. harmony: adaptation to social circumstances instead of change
vii. mastery: active self-affirmation to accomplish group and personal ambitions

Hofstede's and Schwartz approaches emphasise the cultural values. Other researchers took a different approach to culture and its cross-border effect on suicide. Inglehart (1997) focused on attitudes and social beliefs. Two factors were identified: traditional versus secular-rational, a dimension that confronts societies with strong religious

accents, proud national identity and an enforced educational system which tend to promote male dominancy against a secular community oriented towards multi-culturalism, personal achievement and secularisation; and self-expression versus survival, a dimension that confronts a society which promotes participation in politics and social life, self-expression, tolerance and similar values against a society that opposes anything that is not related to its survival.

In cross-culture personality studies conducted by Mc Crae (2004) and Mc Crae et al. (2005) the emphasis is on personality traits and how these are manifested differently in cultures. It was however noted that even though personality and culture are associated, their link is statistical and cannot be generalised to an individual level (Hofstede & Mc Crae, 2004).

Evidently there are significant overlaps between the four authors identified above and between theories of culture and suicide in general. However, their theories and research have had an ample effect on millennial studies and have been employed in cross-national analytical studies on suicide and suicide-related themes (Gouveia & Ros, 2000; Lenzi, Colucci & Minas, 2012; Lykes & Kemmelmeier, 2014; Schwarzenthal & Milfont, 2016).

The more recent studies, even though broadly based on Durkheim's theory, have factored in paradigm shifts within different societies. In most developed countries, survival became a lower priority as it is somewhat secure. In post-modern societies, values like tolerance and diversity and well-being have taken precedence even over economic growth (Inglehart, 2000). This is changing the world as we know it and such turbulance could possibly be a cause as to why mental illness is on the rise (Whitley, 2008). Theoretically, this is similar to Durkheim's anomie which was built around the transition from a rural to an urban society. Today's anomie is created by a society transitioning from stable homogeneous culture to a fully democratic society which promotes individualism and heterogeneity (Zhao & Cao, 2010).

This re-awakening in cross-cultural sociological studies has opened up new avenues of research which may be adapted into suicidology. Seminal works on data obtained from social media across nations conducted by Annamoradnejad, Fazli , Habibi, & Tavakoli

(2019) is adaptable and can shed more light on the socio-cultural aspect of suicide. It may also be a way to see the common we share rather than look at cultural difference as means to negatively distinguish one group from another (Takahashi, 1997).

The Ideation to Action Models

In this process, acknowledging that as yet, we were unable to effectively predict suicidal behaviour, particularly suicidal actions, new theories on the subject emerged and established others evolved. Whereas a multitude of research identified many risk factors for suicidal ideation, very few identified risk factors for suicide attempts or rather there is little research into identifying if there are any distinguishing risk factors between suicide ideation and an attempt (Burke & Alloy, 2016). Considering that approximately ten per cent of those who attempt or commit suicide are not diagnosed with any known psychiatric condition (Oquendo et al., 2008), this line of research has become increasingly important to highlight those specific risk factors relative to persons who may attempt suicide.

Such theories and the research associated with it, also puts at the forefront the notion that even though in a continuum, there are distinct processes, functions and correlates in every stage of the ideation to action framework. The careful differentiation of the distinctive markers of suicidal behaviour may be key to the further enrichment of our knowledge and possibly the best bet in formulating the best suicide preventive programmes and formulating the best mental health care strategies (Klonsky, May & Saffer, 2016).

These recently-proposed theories suitably fit in the ideation to action model first employed by Thomas Joiner in his *Interpersonal Theory of Suicide (IPTS)* (Joiner, 2005). These theories, including the *Integrated Motivational-Volitional Model*, (IMV), the *Three Step Theory* (3ST) and to a certain extent the *Fluid Vulnerability Theory* (FVT) are built on the same conceptual approach of the ideation to action model. They are broadly consistent in their objective to classify and characterise what behaviours distinguishes persons who attempt suicide from those who only think of it (ideators). These studies

drift away from the purely psychiatric models of suicide and venture into an integrated approach which includes fields of studies like psychology, biology, environmental health and other health sciences (O'Connor, 2011).

The separation of suicide ideation from suicide attempts and the acknowledgement that suicide ideation may be rooted differently than suicidal behaviour is important. It is a significant development from the long held and common notion that suicide attempts are the result of aggrieved ideation. This separation is also critical as most individuals that think of committing suicide do not actually attempt suicide (Have et al. 2009). Older research, was often focused more on finding singular risk factors, which most often boiled down to mental illnesses like depression and hopelessness, without taking into proper account the various interactions each risk factor has with other risk factors and with social, biological and environmental constructs. More importantly, it was noted that on their own, these risk factors did not have a high predictive value for persons attempting suicide even though they were robust in predicting suicide ideation (Kessler, Borges & Walters, 1999).

The Interpersonal Theory of Suicide (IPTS)

Thomas Joiner published his Interpersonal theory of Suicide in 2005 and for the first time more than one single and overarching explanation of suicide was given. Up to this publication, research addressed suicide as a result of one single factor without interaction with other known factors. Joiner proposed that a person had to desire to attempt suicide but also had to have the capability to act on what was desired. The IPTS proposes for a person to progress from suicidal desire to attempt suicide, that person would have gone through stages where he or she felt that they did not belong anywhere and were a burden on their family and others. This *thwarted behaviour* coupled with *perceived burdensomeness,* foster suicidal desire.

An acquired desire to die, independently, is however not adequate nor sufficient for a person to commit suicide. Inherently, humans do not wish to die and want to avoid injury, thus any human essentially has developed a solid fear of death and pain. Persons

who may constantly be exposed to fearful and painful experiences, what Joiner calls *painful and provocative events,* may assimilate enough fearful and painful experiences to habituate themselves with enough fear and pain that they overcome this natural fear of death and pain and thus are able of taking their own lives (Joiner, 2005).

There has been a number of studies which employed the IPTS and found, to different degrees, favourable evidence in support of the theory (Ma, Batterham, Calear & Han, 2016; Chu, et al., 2017; Ren et al., 2018). These studies have shown the importance that the ideation to action model should evolve in a manner to take into account more complex relationships between key markers in the transition to a suicide attempt. For this reason, further theories within the ideation to action framework were born.

The Integrated Motivational-Volitional Model (IMV)

The IMV model, first published by Rory O'Connor in 2011 and updated in O'Connor & Kirtley (2018) employs a comparable construct to the IPTS. It conceptualises three phases into which a person's ability of committing suicide saturates. The first phase is the *pre-motivational phase* in which the IMV model utilises knowledge from other theories to chart the setting and context in which suicide occurs and notes environmental and pre-dispositional psychological factors as well as significant life events. The second phase is the *motivational phase* in which a person's suicidal ideation develops into intention and ultimately crystallising the ability to attempt suicide. This development is affected by various factors and life circumstances and leads to feelings of defeat and humiliation. If these feelings of defeat and humiliation find ground in pre-existing moderators such as low self-esteem, poor coping skills or limited problem-solving abilities which are a threat to the same person, the person may feel entrapped. The process of entrapment weakens the person's ability to be positive. If this is coupled with other motivational factors such as negative feelings of lack of belongingness and burdensomeness, feelings of lack of family and social support and lack of forward-looking goals, the person's own psychological well-being is shaken to a point where the

person sees suicide as his or her solution and thus would result in an increased intention to commit suicide (O'Connor, 2011).

Following the motivational phase is the *volitional phase* in which the intention built up in the motivational phase is ratified. If the person has a degree of volitional motivators including an elevated impulsivity, access to the means by which he or she can commit suicide, lack of fear of death and lower pain sensitivity, the person's suicidal intention progresses into suicidal behaviour (O'Connor& Kirtley, 2018).

The IMV model was refined in 2018. Acknowledging that a person who attempts suicide has a higher risk of attempting again (Kessler et al., 1999, Nordstrom, Samuelsson & Asberg, 1995), the IMV model recognised the cycle created by a person in swaying from an attempt back to ideation and again to another attempt. In this process, it is highly unlikely that the metamorphosis from suicidal ideation into suicidal behaviour be the same or that it will start afresh. It is rather more plausible that is such cases, the process from ideation to action would manifest in different ways. For this reason, the revised 2018 model of the IMV introduced eight volitional factors together with seven key premises which together expand the application of the model. (O'Connor & Kirtley, 2018).

The incorporation of belongingness and burdensomeness into the motivations phase of the IMV makes it similar to IPTS in its ideation to action scheme as does the acquired capability in the volitional phase. However, the IMV puts forward defeat and entrapment as the conduit to suicidal ideation and not belongingness and burdensomeness. Secondly, the volitional phase of the IMV goes beyond the acquired capability featured in the IPTS and includes factors such as access to the means, impulsivity and imitation including social contagion (Klonsky, Saffer & Bryan, 2017).

This model has taken a primary role in more recent research with a high degree of success. One such study reliably established that persons who attempted suicide differed from those who only thought of it on all volitional factors on volitional markers including their lack of fear of death, having a high degree of impulsivity and their exposition of suicidal behaviour (Dhingra, Boduszek & O'Connor, 2015). Conversly,

ideators and attempters did not differ on motivational markers sustaining other research that had already indicated similar findings (Taliaferro & Muehlenkamp, 2013).

The Three Step Model (3ST)

The 3ST is still in its infancy as it was only published by David Klonsky and Alexis May in 2015. As the name suggests the theory proposes the idea there are three steps on the ideation to action continuum. The first step implies that suicidal ideation is a result of the combination of pain and hopelessness. Pain which in cases related to suicide tends to be psychological, is not defined as it is quite subjective. The 3ST asserts that pain makes life miserable and this is the punishment for engaging in life. As this sentiment grows, so does the desire to die. If on the other hand, the sentiment that life is a punishment is counteracted with the hope that pain will ease with time, determination and effort, one's focus would be tracked into achieving more in life by seeking to enrich the future rather than kill oneself by suicide (Klonsky & May, 2015).

The second step contends that life is seen as worth living when a person feels that he or she belong and are connected to others, being family, friends or any significant others. It is only when pain exceeds a person's belongingness and connectedness that suicidal ideation increases. It is natural that the greater the pain, the greater and more persistent would be the degree of ideation be (Klonsky & May, 2015).

The third and final step maintains that when a person achieves the capacity to attempt suicide, ideation progresses to action and hence suicidal behaviour. The theory further avers three main contributors to the capacity to attempt suicide: *dispositional contributors* including a high tolerance to pain and a being less fearful of death; *acquired contributors* such as an acquired desire for death similar to that proposed in the IPTS; and *practical contributors* like having knowledge of firearms or other lethal means (Klonsky & May, 2015; May & Victor, 2017).

The emphasis on connectedness and its role in the weakening or augmentation of suicidal ideation and the notion of acquired capability, runs parallel in the 3ST as the same ideas in the IPTS. However, whereas perceived burdensomeness and thwarted

behaviour in the IPTS are considered to be the direct ascendant to suicidal ideation, in the 3ST, these are considered to be vehicles that can cause pain and hopelessness which are considered as the primary motivators to suicidal ideation. The reason for this departure of the 3ST from IPTS is that the causes of pain and hopelessness are diverse and can stem from a multitude of stimuli. Secondly, one can have perceived burdensomeness and thwarted behaviour without these evolving into suicidal ideation. In a sense, all this makes the 3ST similar in more than one way to the IMV model which incorporates the notions of access to the means and acquired capability in its explanation of the ideation to action model (Wetherall et al., 2015).

Fluid Vulnerability Theory (FVT)

Unlike the previously discussed theories, The Fluid Vulnerability Theory (FVT) suggested by M. David Rudd in 2006, does not exactly indicate any particular psychological process, thought or belief to be a direct precursor to suicide attempt but cogitates a wider range of ideas referred to as the *suicidal belief system* (Rudd, 2006). The FVT considers the specific variables designated by the IPTS, IMV and 3ST not as near absolutes, as their respective theory considers them, but only as different or alternative routes in the manifestation of suicidal behaviour. This may be rooted in the fact that the FVT is similar to other cognitive-based theories in that it is based on Beck's theory of psychopathology (Klonsky et al., 2017).

In their study with U.S. military personnel, Bryan and Rosek (2017) examined the outcome of various studies which focused on the treatment of post-traumatic stress disorder and suicide risk. The suicidal belief system which is broad and includes wider psychological indicators. Bryan and Rosek (2017) clustered these psychological processes into two mechanisms: emotional regulation and cognitive flexibility. Clinical trials for the same study indicated that if these two mechanisms are targeted together, the transition from suicidal ideation to action can be interrupted. This may imply that the transition from ideation to action is not static and extends beyond limited variables (Bryan & Rudd, 2016).

The FVT is, in fact, based on the idea that the transition from ideation to action and suicide risk itself is a process, with some factors being quite stable and others being of a more vigorous and dynamic nature continuously changing in response to various stimuli and personal processes (Rudd, 2006). The natural interaction between stable and dynamic processes may result in the emergence of suicidal behaviour. It is therefore useful to understand this interaction in order to understand how suicidal behaviour develops (Kleiman, Turner, Fedor, Beale, Huffman & Nock, 2017).

The Psychological Autopsy

The psychological autopsy is a technique designed to combine data from various sources on a variety of factors regarding a singular person. It is essentially an investigative tool in the process of the psychological evaluation needed to establish facts without direct observations or access to the information required (Ebert, 1987).

The origins of the psychological autopsy are in Shneideman's experimental approach to assist coroners in establishing the mode of death in ambiguous or equivocal deaths (Shneideman & Farberow, 1957). The method is built on the analysis of various sources of information; police reports, official medical records, interviews with people close to the deceased, personal documents, particularly suicide notes, letters, diaries or personal journals and any other source which may shed light on the life of the deceased especially the last days before death occurred. As David Canter put it, "a psychological autopsy is an attempt to reconstruct a person's psychological state prior to death" (Canter, 2000, p.2). The original scope of psychological autopsies evolved and has been widely used in the examination of risk factors of suicide (Hjelmeland et al., 2011).

The psychological autopsy is a versatile technique which has been successfully employed in different settings including the medical and legal fields. The objective of a psychological autopsy is to collect broad-ranging information to generate a profile or a comprehensive view of the deceased. This serves multiple purposes. Initially it was used by coroners to determine the mode of death where this was not clear but this was

extended to determine if a death was the result of accident, suicide or homicide (Murthy, 2010).

In addition, psychological autopsies are used to establish the mental state of the deceased before death and are thus used extensively in the reconstruction and determination of the events leading to death (Saxena & Saini, 2017). An integral part of the psychological autopsy is the conduction of interviews with people close to the deceased. These are a good source of information but can also serve as a tool to bring closure to those persons by serving as a form of catharsis which allows them to come to terms with their loss (Ebert, 1987).

The psychological autopsy has been described as the most successful technique in the assessment of the relationship between risk factors and suicide (Cavanagh et al., 2003). Through this systematic approach not only is information gathered for the purpose of that particular investigation but it is also used in the interpretation of information gathered through other techniques (Hawton et al., 1998).

The procedure of the psychological autopsy is generative in the sense that in a scientific manner, information and knowledge are accumulated and developed to be utilised in future interventions and can thus be used to solve similar cases (Yadav et al., 2010). However, the purpose of a psychological autopsy is not simply to collect any data but more so to structure that data into what Berman & Litman, (1993) defined as "a logical understanding of the relationship between the deceased and the events and behaviours that preceded the death" (Berman & Litman, 1993, unnumbered manuscript). It must attempt to answer three questions: Why did the person do it? How did the person do it? and What is the most probable mode of death? (Shneidman, 1981). To answer the first question, one needs to establish the intention and the reasons as to why a person decides to die by suicide. It may therefore be described as a "reconstruction of motivations" (Shneidman, 1981, p.327). To answer the second question, an examination of the deceased's life events is required and any relationship between such events and that person's death must be uncovered. By doing so, one would ascertain the motive the deceased had in dying at that particular time and in those particular circumstances. The third question is answered by investigating and establishing the level of lethality of the

deceased and by gaining other information regarding the suicide (Ebert, 1987). On the level of lethality, Shneidman (1973) had already differentiated between three classes of motivation to die: intentional, sub-intentional and unintentional. The importance of lethality in suicide is that it provides vital information on the behaviour of the deceased just prior to death (Denning, Conwell, King & Cox, 2000). Apart from its importance to the suicide under review, such information is valuable in the assessment and prediction of suicide in general.

There is no one established route as to how a psychological autopsy is conducted. After many years of practising the procedure, Shneidman provided some guidelines for the conduction of psychological autopsies by suggesting sixteen categories of information which should be examined. These however, are only broad classes of information and do not exclude anything else worth collecting (Shneidman, 1981). Emphasis is made on mental health and issues arising from it but Shneidman purposefully kept the functions of the technique broad yet encompassing. It follows the notion that the more information a psychologist can obtain on the deceased, the clearer and more accurate an assessment is likely to be. The methodology employed is only a means to the end result of determining facts (Ebert, 1987).

The nature of information which is typically collected through a psychological autopsy can be broadly assigned to three categories; biographical information including demographical data like age and marital status; personal information including what relationships the deceased had, lifestyle markers like alcohol or drug use and social affiliations; and secondary information acquired through different sources like police records, personal diaries or journals and from interviews with significant others.

The reliability, validity and limitations of the psychological autopsy

The strengths of the psychological autopsy have been outlined in various studies (Leenaars et al., 2018; Zhang, Conwell, Zhou & Jiang, 2004) with some describing the technique as the cornerstone of suicide studies (Murthy, 2010). This does not mean that there are no studies questioning the validity of the method and highlighting the

limitations of the technique (Hjemeland et al, 2012; Poulet & De Leo, 2006). Although psychological autopsies have been praised as a tool in obtaining extended information regarding mental illnesses, physical disorders, and life events from persons close to the deceased, this has drawn some criticism due to possible interviewer and interviewee bias. Psychological autopsies have also been credited as the best technique in assessing which factors pose a higher risk for suicide especially when such studies include a control group (Cavanagh et al., 2003). These same studies have, however, been shown to manifest inconsistencies (Chiu et al., 2004).

Pouliot and De Leo (2006) as did Beskow, Runeson and Åsgård (1990) before them listed various weaknesses which seem to have since been either addressed minimally or not addressed at all. Psychological autopsy as a technique has been criticised for its focus on the medical and psychiatric elements and its tendency to attribute suicide to mental health issues even when these are only minimally present (Cavanagh et al., 2003). There is no doubt that people with mental illness are more at risk than other to resort to suicide but most people with mental disorders to not die by suicide (WHO, 2018). The problem may lie in the definition of mental illnesses as these do not differentiate between disorders and distress (Pridmore, Ahmadi & Pridmore, 2019). Mental disorders may be more chronic in nature than distress which may be temporary (Golderg, 2000). Through psychological autopsies, this distinction is not always delineated hence there is a tendency that minor distresses are interpreted as mental disorders (Pridmore, 2009).

Suicide has occurred throughout the ages and can be considered as universal. Its face and characteristics however, vary from nation to nation, by culture and between ethnic groups (Rockett et al., 2010). Such findings suggest that results of examinations of particular attributes in suicide cannot be generalised as they interact with other social and cultural factors (Lester, 1997). This may be the result of the non-structured nature of the psychological autopsy technique which allows for various tools and instruments to be used whilst allowing for interviewer bias and error to go unchecked (Werlang & Botega, 2003). Other weaknesses related to interviewers and psychologists conducting psychological autopsies in general are the lack of dedicated training and lack of control

over their expertise level, psychological, social and cultural characteristics, all of which may influence the conduction of the psychological autopsy process (Beskow et al., 1990; Zhang et al., 2002).

To mitigate informant bias, in most psychological autopsies today, information is gathered from more than a single informant. It is well established that every person may have an agenda, may express guilt or anger, may regret something or may attempt to picture the deceased in a better manner (Wertheimer, 1991). Interviewing more than one informant has the added advantage of reducing such emotional and recall biases as well as addressing selective recollection (Hawton et al., 1998).

One last limitation psychological autopsy may manifest is that the time between a suicide and the conduction of the interview is of the essence. It has been noted that confounding factors associated with time and memory may alter, or at least have an effect, on the final result of an interview (Hunt, 2004). There is no agreement as to the ideal time frame within which to conduct an interview. Beskow et al. (1991) suggests two to six months from the suicide whilst Hawton et al., (1998) suggests between three and twelve months after the event.

Ethical Issues

Beskow et al., (1990) summed up the ethical issues surrounding psychological autopsies as being threefold: the integrity of the deceased, the integrity and health of the interviewees and the psychological well-being of the interviewer. The deceased ought to be protected and anything that the deceased chose not to divulge to others should be respected and kept confidential. Even though family and friends have the right to know what happened, they do not have any right to know that which the deceased did not want them to know. The distress experienced by survivors of suicide may take a long time to heal and interviewers should gauge the level of distress an interview about a significant other might cause. Some survivors might feel ashamed, guilty or angry. Their needs should not only be respected and gauged to reduce the chance of emotional bias during the interview but, more importantly, handled well enough to serve as a

psychological closure for the interviewee (Bernstein, 2011). Finally, interviewing survivors of suicide is surely not an easy task for interviewers. Apart from the academic and practical training required in conducting a psychological autopsy, the interviewer should be able to interpret any signs of emotional strain on him or herself and handle crisis which may be precipitated by any actions taken by either interviewee or interviewer. The three "tasks" can be condensed into one of taking care of one another. One cannot safeguard scientific interests without safeguarding the well-being of all participants be they interviewees or interviewers or others who process any information as part of the procedure of evaluation.

Contribution to criminal investigations and admissibility in legal procedures

Despite the criticism and the lack of standardisation and other validity issues, psychological autopsy as a technique used in investigations is respected as being robust enough to be used in courts and to be of influence over judges and juries (Canter, 2000). There is also literature that shows that medical practitioners are more comfortable with the conclusions of psychological autopsies than with other reports (Jobes, Berman & Josselson, 1986). Relative to other techniques used in investigations like criminal profiling, the psychological autopsy technique is more established in science than any other as it examines the behaviour of the deceased before death and draws conclusions based on comparison with data collected from other suicides over a long period of time. As such, it follows a published rigorous scientific procedure. Apart from this, a psychological autopsy seeks to establish what was in the mind of a known person (the deceased) and not establish what kind of mind an unknown person might manifest (Ormerod, 2001). This difference makes it more admissible in courts than other techniques which rely on subjective procedures. Perhaps one hurdle to this acceptance has been created by practitioners themselves in their reluctance to formulate and follow a standard which could be deemed as "a generally accepted approach". Such approach would increase the validity of the technique by following a standard that is known and can be referred to by everyone. In American Courts it would satisfy the Frye standard

meaning such evidence would be accepted within the scientific community pertaining to that field of study (Steadman & Konigsberg, 2016). Admissibility under the Daubert standard is more rigorous as it includes whether the technique is reliable, follows a standard set out by peers, has a known rate of error and can be scientifically replicated. (Snider, Hane & Berman, 2006). In the European legal systems including Malta, psychological autopsies might be accepted as proof in the civil court where a balance of probabilities is accepted as the standard for judgement but not in the criminal courts where a proof beyond reasonable doubt is required.

Conclusion

Regardless of weaknesses and limitations, psychological autopsy studies have been instrumental in sustaining our current knowledge on the aetiology of suicide and on the suicidal process in general. The technique has been a staple investigative tool for over six decades and evolved and even though there are calls for more valid and reliable data, some regard it as the cornerstone of research in suicide (Isometsa, 2001; Murthy, 2010). One may argue that with its highlighted limitations, most psychological autopsies are the product of biased recollections and the information derived from them is incomplete. However incomplete it may be, a psychological autopsy, duly conducted, may provide invaluable information about the state of mind of a person before death. Such information may enable investigators and adjudicators to reach a more convincing conclusion but more importantly, contributes to the rich knowledge and insight generated by all psychological autopsies together.

A Public Health Approach to suicide

Global epidemiological data indicate that the number of people who die by suicide worldwide is double that of people dying due to armed conflicts (CHMA, 2016). It is no surprise that the World Health Organisation is calling suicide a public health problem (WHO, 2018). Up until recently, suicide research has focused on risk factors and global

health services focused on providing psychiatric and psychological interventions to those who manifest symptoms of known suicidal behaviour (CDC, 2020). This approach to suicide has burdened mental health professionals with the exclusive responsibility for recognising suicidal behaviour and for providing medical solutions (Cutcliffe, Wylie, Links & Santos, 2017). In response to this. a public health approach emerged. This emphasises the communal responsibility of suicide and proposes actions that can be taken by the general public in order to prevent suicide (Hoven, Wasserman, Wasserman & Mandell, 2009).

The advantages of a public health approach to suicide are numerous. First, this approach banks on the general population in its natural drive to improve health. It therefore focuses on the preventive side of the people much like what happened with smoking and road safety where the general sentiment is that deaths arising from smoking and traffic accidents are preventable. Suicide has been regarded as inevitable but preventable (Samaritans, 2019). Secondly, the public health focus on prevention versus treatment addresses a broad range of risk and protective factors of suicide. As a public health approach is actually built on health promotion, emphasising protective rather than risk factors is one way of preventing suicide before it ever occurs (Dumensnil & Verger, 2009). Thirdly, public health is committed to increase the understanding of suicide prevention through science. In this way new and updated solutions to suicide can be found. Finally, a public health approach values multi-disciplinary collaboration between various professions. This brings together different perspectives, experiences and knowledge to strengthen solutions within the community (CDC, 2020).

On Suicidal Behaviour

Over the last few decades, various studies have highlighted several factors which may increase the risk of a person attempting suicide. Most of these studies stemmed from the need to have tangible knowledge on a social problem that was raising its head as numbers of suicides and attempted suicides escalated around the world. These studies

span in different social fields including psychiatry, psychology and other human and social sciences (Hawton & van Heerengen, 2000). Unfortunately, the approach of establishing which factors increased the risk of a person attempting suicide and the emphasis on studying them singularly produced a fragmented scenario (Wenzel & Beck, 2008). Focus in research began to shift into amalgamating the disjointed knowledge to establish how the separate risk factors interact. It is in these circumstances that the empiricalisation of suicidal behaviour was born.

Suicidal behaviour has often resulted in injuries, hospitalisation and other short-term disruptions which may in themselves be life-threatening. It has been therefore considered to be a financial burden on every nation (Nock et al., 2008). Suicidal behaviour has been used as an umbrella term for any behaviour from suicidal thought to death by suicide. Often, specific self-destructive acts and behaviour in between these extremes, is intended to cause self-harm or injury. These may include acts of planning and action on fatal or non-fatal attempts that are many times over-shadowed or simply denoted as suicidal behaviour.

As research in suicide theory shifted towards the discovery of particular distinct behaviours that precede suicide rather than taking a generalised risk approach, it has become imperative to set out clear definitions and terminology to avoid confusion. Whilst suicidal behaviour, as a term, remains in popular culture as an encompassing term, it has metamorphosised into a distinctive disorder and included in the Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5) (APA, 2013) as an emerging diagnostic. A distinction was made between suicide ideation, suicidal and non-suicidal self-injury, attempted suicide and suicide. This distinction may have a practical aspect in that before its definition, queries regarding suicidal behaviour were only made in the contest of already defined disorders like Major Depressive Episode and Borderline Personality Disorder. This may have led to situations where suicidal behaviour exhibited by persons who did not manifest other symptoms of either a major depressive episode or borderline personality disorder were overlooked and not deemed as threatening and suicidal simply because they did not fit into the prescribed formulation of those indicated disorders. (Oquendo, Baca-Garcia, Mann & Giner, 2008).

The proposed criteria in the DSM 5 in defining suicidal behaviour disorder is the attempt to die by suicide within the previous 24 months preceding the examination. The definition of a *suicide attempt* as a "self-initiated sequence of behaviours by an individual, who at the time of initiation, expected that the set of actions would lead to his or her death" (APA, 2013, p. 801) makes a clear distinction from *non-suicidal self-injury* which is defined as "a self-injury directed to the surface of the body undertaken to induce relief from a negative feeling/cognitive state or to achieve a positive mood state." (APA, 2013, p. 801). This clear distinction from the diagnosis of other mental illnesses has been a further impetus for researchers to delve into the more specific nature of what suicidal behaviour really is. It is also prudent to point out that a person can only be diagnosed with having this disorder after there is a suicide attempt.

Risk factors for suicidal behaviour are rooted in both a social-level risk and individual-level risk. The profound impact of social mechanisms may increase the rate of suicidal behaviour and suicide. It has been reported that the social changes among Inuit communities in Canada including assimilation into Westernised societies and disruption of their traditional social fabric were factors that increased suicide rates (King, Smith & Gracey, 2009). Conversely, homogeneous societies which are socially cohesive and values moral harmony have been found to manifest lower rates of suicide (Oquendo et al., 2005).

Individual risk factors may have more far arching implications than social ones in their effect on suicidal behaviour (Sung-Man, 2018). It is generally accepted that suicidal behaviour runs within families (Brent et al., 1996) and that the risk of suicide attempt is higher for family members of a person who dies by suicide (Brent & Melhem, 2008). This may be due to generic heritage but studies in this area have yet to produce conclusive evidence as to which gene or genes are involved in the transmission of suicidal behaviour (Zai et al., 2012). Some studies sustain the notion that suicidal behaviour is transmitted within the family genetically and not only by imitation or learnt behaviour routes. A study of twins and adoptive children estimates that genetics may be responsible for as much as 43% heritability with regards to suicidal behaviour, with lower percentages for suicide attempts (McGuffin et al., 2010). Studies have also

differentiated the pathway of suicidal behaviour from that of suicidal ideation which appears to be transmitted with psychiatric disorders particularly mood disorders and from learnt behaviour rather than genetically (Brent et al., 1996). Other psychosocial factors like sexual orientation, gender identity, (O'Connor & Nock, 2014), parental neglect and childhood emotional abuse (Figueiredo & Abreu, 2015) increase vulnerability to suicide. The association between early-life adverse experiences and suicide risk is well documented in prospective and retrospective studies which indicate that the type of abuse, the frequency and the relationship of the victim with the abuser all have varying effects on the manifestation of suicidal behaviour. (Fergusson, Woodward & Horwood, 2000). These early-life adverse experiences are many times transmitted within the family, possibly explaining why suicidal behaviour is also passed through the family (Brent & Melham, 2008).

The genetic pre-disposition to suicide may manifest itself throught the association it has with other personality traits which themselves are associated to suicidal behaviour. Even though depression and anxiety have been singled out as strong contributors to suicidal behaviour, aggressiveness, antisocial behaviour and substance abuse including alcohol seem to have stronger effects on suicidal behaviour in adolescents and youth (Seguin et al., 2014). Mood disorders are usually present at a later adult age but remain stable and are considered as life-time risk factors of suicide. However, the highest risk of suicide has been noted in people who develop a mood disorder associated with suicidal ideation comorbidly with a condition that increases distress like panic disorder or a condition that decreases restraint like anti-social disorder (Nock et al., 2013). Early life adverse experiences cause cognitive deficits in children particularly related to memory, problem solving and self-regulation, all to which have been associated with a higher risk of suicide (Chartier, Walker & Naimark, 2010). This nexus of distal and mediating factors especially when these are impulsive – aggressive ones, coupled with anxiety traits have been found to be transmitted as genetic programming during foetal development in pregnancy (Buss et al., 2017). It partially explains the relationship between childhood adverse experiences and a higher risk of suicidal behaviour (Brent et al., 2015).

Some risk factors are more closely associated with suicidal behaviour than others. Apart from suicide attempts, psychopathology is the strongest factor in predicting suicidal behaviour. As discussed previously, retrospective interview techniques like the psychological autopsy have been successfully used to extract knowledge about the association between metal illnesses and suicidal behaviour. Research has consistently shown that a very high percentage of persons who die by suicide had a diagnosed psychiatric condition. Most of the persons suffering some from mental illnesses do not die by suicide but some conditions have a stronger relationship to suicidal behaviour than others (Arsenault-Lapierre, Kim & Turecki, 2004). Major depressive episodes due to major depressive disorder or bi-polar disorder show the strongest and most durable relationship to suicide (Cavanagh et al., 2003). A very strong link has also been shown between psychotic disorders like schizophrenia as they are also associated with depressive episodes. All such illnesses are positively associated with a higher risk of suicidal behaviour especially when the person engages in other high-risk activities such as drug and alcohol consumption and it is not unusual for persons manifesting suicidal behaviour to comorbidly have more than one condition (Nock et al., 2010).

A rapidly developing area of research is the study of molecular changes in the brain, the peripheral nervous system and the endocrine system which can be linked to underlying suicidal ideation and behaviour. This research is built upon the notion that suicide is tied to specific biochemical changes that are detectable and measurable and hence can be manipulated (Turecki, 2014). Some of these processes are already linked to some mental disorders like depression which is commonly associated with suicide. The brain is intrinsically integrated within the biological function of the body which, most often, is reflected in the composition of bodily fluids especially the blood. Hormones and other molecular material are transported in blood to receptors all over the body and can thus be utilised to calculate psychiatric biomarkers. If the biomarkers for suicidal ideation and behaviour are unravelled, as has been done for schizophrenia, ADHD and depression, it would reveal the possibility of identifying individuals most at risk of suicide in time for proper intervention. These biomarkers and their study at different stages of an illness or condition may be of sound value for its treatment (Chan et al., 2015; Tomasik et al., 2016). Current studies on the hypothalamic-pituitary-adrenal axis

and how cortisol levels effect suicidal behaviour have shown that the chemical may be associated with increased ideation. Other studies have focused on serotonin levels which has also been linked to suicidal behaviour and can thus be used to predict future suicidal behaviour whilst other studies are focusing on more-complex areas of neuroscience to measure emotional signals in the brain which can also be associated with suicidal behaviour (Offord, 2020).

Suicidal behaviour is diverse, both in terms of constitution and manifestation, making it difficult to formulate a standard model of risk or an all-encompassing treatment formula. The study of suicidal behaviour has developed from the examination of risk factors to include novel areas of study like endocrinology, immunology and serology in relation to suicide. There seems to be a promising potential for the improvement of holistic insight into suicidal behaviour and its prevention and treatment. These areas of study would accentuate the differences between gender, age groups and other risk factors. Although there is no magic formula to predict suicide, an improved understanding of clinical, biological, sociological and psychological factors would potentially ameliorate therapy and treatment of various disorders potentially linked to suicide.

Self-Harm as Distinguished from Suicide

Defining self-harm has met the same fate as other suicidal and related behaviours in that there were several attempts to find a universal nomenclature which is a "commonly understood, logically defined term" (O'Carroll et al., 1996, p. 240). This, as in any other subject, is critical for both research purposes and clinical practice (Silverman, 2006). This effort has however not materialised concretely and in a definitive way.

The term self-harm has been associated with deliberate acts committed by a person on his or her own body (Muehlenkamp, 2005). Some authors emphasise the *intentional* and *non-fatal* nature of self-harm (Morgan, 1979) whilst others argue that the concept of harming oneself is rooted in the act itself and thus it includes any act, notwithstanding the outcome (Gelder, Mayou & Cowan, 2001). This debate paved the way for a wider

approach of the subject in which the question of motivation was weighed out. Motivation has been acknowledged to be affected by too many factors for it to be simply categorised (Morgan, Burns-Cox, Pocock, Pottle, 1975). It has however also created a two-category disambiguation and a descriptive difference across the Atlantic Ocean: whereas self-harm as referred to in Europe includes acts of self-injury with or without suicidal behaviours, the term Non-Suicidal Self-Injury has been used in Canada and the United States to refer, as the name suggests, to any self-injurious without the intention of death. This precludes self-harming behaviours like self-poisoning as self-injury only includes self-mutilation, bruising and anything where tissue damage results (Gillies et al., 2018). In addition to such confusion, the term "deliberate self-harm" has morphed itself to refer only to self-harming behaviour which does not include suicidal intention in the USA but which is more frequently referred to as "self-injury" in Europe (Butler & Malone, 2013).

In Hawton et al. (2003), self-harm comprises all acts of self-poisoning or self-injury which are perpetrated by an individual on oneself, irrespective of motivation. The dual activity notion of self-poisoning or self-injury is also reflected in the National Institute for Clinical Excellence (NICE) definition of self-harm as "self-poisoning or injury, irrespective of the apparent purpose of the act" (NICE, 2004 p. 16). References to absolute terms like deliberate, premeditated or intentional are avoided in Europe. Their use has become associated with judgemental predeterminations and hence discarded for wider encompassing concepts (BPS & RCP, 2012).

Having two broad categories of self-harm does not necessarily mean that they are rigid groups into which a person may be positioned as most often people who self-harm switch methods (Lilley et al., 2008). It has however been noted, that there may be different motivations for using one method over another (Sutton, 2007) but this may be due to practical or personal reasons (Witt, Daly, Arensman, Pirkis & Lubman, 2019).

Self-poisoning has been more commonly recorded than self-injury (Horrocks et al., 2003, Geulayov et al., 2016). Most instances of self-poisoning include prescribed drugs, particularly analgesics and anti-depressants. The evidence suggests that persons who self-poison are more likely to seek medical attention that those who self-injure (Meltser

et al., 2002). This may be one reason why research within the general population has indicated that self-injury may be more common than the reported statistics suggest (Hawton, Rodham, Evans & Weatherall, 2002). Another reason for this discrepancy is that data is still collected in a sporadic fashion from clinics and hospitals, omitting those who do not seek assistance by treating themselves (Fox & Hawton, 2004, Evans, Hawton, Rodham & Deeks, 2005) and those who do not require any assistance.

The most common method of self-injury is self-laceration (Gunnell, Bennewith, Peters, House & Hawton, 2004), but a variety of other methods ranging from swallowing or inserting sharp objects, head banging, self-stabbing and burning have been recorded (Gilles et al., 2018).

Non-Suicidal Self-Injury

In an attempt to sort out the definitional issue, two separate diagnostics were proposed in the DSM-5: *suicidal behaviour disorder* as described earlier and *non-suicidal self-injury (NSSI).* The distinctive hallmark between the two is the intention (Cipriano, Cella & Contrufi, 2017). Whereas a person who indulges in a self-injurious behaviour with the intent to die may be classified with the former disorder, a person who commits self-injury without the intention of dying but only with the intent to cause damage to body tissue may be classified in the latter category.

The presence or absence of suicidal intent, which as indicated is the crux which distinguishes the two diagnoses, can be noted if the individual explicitly declares that there was no intention of death in his or her own actions or can be deduced by the fact that the person has indulged repetitively in the same behaviour with the prior knowledge that such conduct does not typically result in death. The DSM-5, however, elicits three intentions which a person may have when indulging in a NSSI; "1. To obtain relief from a negative feeling or cognitive state. 2. To resolve an interpersonal difficulty. 3. To induce a positive feeling state." (DSM-5, p.803).

One of the characteristics of NSSI is that the behaviour, is often repeated, in the same form or by a different method (Muehlenkamp, 2005). It was reported that 16% of

persons admitted to hospitals for treatment of self-inflicted injuries are re-admitted within a year (Carroll, Metcafe, & Gunnell, 2014). A higher percentage have been reported to attempt suicide within a year of hospital admittance (Heerde et al., 2015; Taliaferro and Muehlenkamp, 2015)

Even though the intention of suicide is not present in persons displaying NSSI, there seems to be agreement among scholars that NSSI is often directly related to suicidal behaviour (Andover, Pepper, Ryabchenko, Orrico & Gibb, 2005; Glenn & Klonsky, 2009). NSSI as a separate DSM classification is novel and requires more empirical data (Zetterqvist, 2015), however, it has already been associated with various personality disorders (Klonsky, Oltmanns, Turkheimer, 2003) and with depression and anxiety disorders (Nock, Joiner, Gordon, Lyoyd-Richardson & Prinstein, 2006).

On Suicide Ideation, the Desire and the Planning to Attempt Suicide

As distinct from suicidal behaviour, self-harm and non-suicidal self-injuries, ideation is probably the first step in the process of suicide. It can be described as the stage of psychological build-up before a person actually desires and plans to attempt suicide. Suicidal ideation is more common than suicidal behaviour as more people engage in thought of suicide rather than in actual behaviour targeting the commission of suicide (Borges et al, 2010). As it is not as overt as suicidal behaviour, it has been difficult to quantify and thus utilise in a risk analysis or as an indicator to suicide as a risk factor (Mc Auliffe, 2002). However, research into suicidal ideation has been coupled with research on past suicidal attempts and has been shown that the two are related and ideation predicts attempts (Posner et al., 2011).

Late in the 1970's the notion of passive and active ideation was presented, possibly in response to delineate suicidal ideation from suicidal behaviour. Passive ideation are thoughts about suicide, not necessarily bound to attempt except when these thoughts became a "desire" or a "wish to die". When such thoughts grow into an active search for a way a die, the ideation is no longer passive but turns active as the person signals a movement into further stages to ultimately die by suicide. Beck, Kovacs and Weizmann

(1970), distinguished the "desire to attempt suicide" from "planning to attempt suicide" in that there could be no planning to attempt suicide, and therefore a more active role, if first there is no desire. Desire is therefore the first form of activity after conceptualising death by suicide at the ideation stage (Posner, Brodsky, Yershova, Buchanan & Mann, 2014).

This classification into different stages is practically a ranking order of severity where suicidal ideation is followed by passive ideation, growing into an active ideation and a desire to attempt suicide followed by various degrees of planning to attempt. The underlying factor in all scenarios is the intent. This notion has been incorporated in more recent research which delved further into the question of the *intent to act* vs the *intent to die* which does not necessarily mean the same or have the same outcome. Whereas a person intending to attempt suicide may do so without an intention to die, a person with the intention to die, actually attempts suicide to die (Posner et al., 2011).

On a Favourable Attitude Towards Suicide and an Attraction to Death

Ideation, desire and an intention to die will most probably flourish into a favourable attitude and at attraction towards death if the continuum is not controlled or diverted in any way. A favourable attitude towards death develops when the intensity of the intention to die overcomes and outweighs the psychological barriers to death and thus the balance is tipped in favour of death in what is termed as an *internal struggle* between the wish to live and the wish to die (Kovacs & Beck, 1977). At this stage, the person would have overcome inner deterrents to death like guilt feelings for leaving survivors and moral or ethical objections to terminate one's own life (Beck et al, 1979).

An attraction to death is sustained and ultimately galvanised upon the person's convincement that one should take one's own life. Even though this may not be fully articulated, the person would transit into an advanced phase of choosing how and when to die. A decision on the method and manner of death is taken after considering such environmental factors and opportunities like the place of death, how many people could be present or could pose a risk not to fulfil his or her decision to die (Beck et al., 1979).

Having an attraction to death does not necessarily mean that the person does not have doubts as to whether one should continue with preparations to attempt or not. This, in itself is a stronger indication of risk, but having lingering doubt may still prevent the person from attempting suicide. Most often, in these cases, the stronger the conviction of dying by suicide, the higher the level of preparedness to attempt or die by suicide would be (May & Victor, 2017).

On Deciding to Attempt Suicide and the Preparedness to Attempt

When the person enters the final stage of preparedness to attempt suicide, the level of risk is at its highest. Only few of those who have a plan progress to decide on attempting suicide (LeMaster et al., 2004). Those who do decide to attempt suicide, however, are usually adamant to do it and will meticulously plan it to the last detail. Such last actions could include settling paperwork and bills, producing a will and setting the house in order. They complete their actions when they feel they are prepared to attempt, which does not necessarily mean immediately; it can take hours and days before any action is concretely taken. It has been noted that the preparedness is higher in older adults (De Leo et al., 2001). During the time between the decision to attempt and the actual attempt the person could seem to function normally. This may be one reason why, mistakenly, some, particularly the family and close friends. assume that a suicide may have been improvised and impulsive. In reality, the fact that the person would have decided to attempt suicide may seem to him or her to be liberating enough to act without sadness (Samaritans, 2016).

Conclusion

The theoretical models of suicide presented in this chapter draw from sociology, psychiatry and psychology. Theories evolve through the contribution of novel research works which through their output provide avenues for further development. Most of the theories discussed in this chapter relate to the presentation and manifestation of risk factors of suicide. Each of these theories have been shown to provide beneficial insights

especially in enriching understanding of the subject (Hawton & van Heeringen, 2000). It is also of note that more recent theories are broadening the knowledge base by becoming broader in their focus and scope. Integrated models are built by drawing on knowledge discovered by various other fields including neuropsychology, bio-technology and other biological theories.

By providing particular perspectives on how various risk and protective factors of suicide interact, each theory has provided insight into the individualistic underpinnings of suicide. It has been shown that risk factors are more dynamic than static and do not necessarily manifest in a constant manner. Complicated as this may seem, researchers have sustained the various theories discussed in an attempt to find ways to measure the different actions that precede suicide, ultimately, in order to prevent it.

The theories discussed also highlighted the importance of multidimensionality in suicide research. Various 'ideation to action' models, which many deem to be the most comprehensive explanatory models of suicide are increasingly being enriched by researchers from different fields of study who continuously develop the subject of suicide through their input from biology, psychiatry, psychology and sociology.

The theories are supported by literature regarding suicidal behaviour, self-harm and non-suicidal injuries. The importance of these subjects lies in their being common elements within and across various theories. Theories are not developed overnight but are built upon an ever-evolving research base. As models of suicide draw from various other disciplines including psychology, psychiatry and sociology, their presentation in this chapter sets the background for the theoretical and practical development of this study.

Chapter 3 – Ideographic Factors of Suicide

The World Health Organisation has appealed to all nations to systematically consider suicide prevention as a "global imperative", and to place greater emphasis on reviewing "risk and protective factors and related interventions" (WHO, 2014 p.8). The examination of risk and protective factors of suicide is an evidence-based approach to the subject, which could ultimately inform prevention efforts. In the same manner, these could be useful for the police in their practical investigations of suicide. Risk factors, however, are an intricate subject. Their relationship with each other and with environmental factors can produce an array of possibilities that can often be misunderstood or not understood at all. Suicide has been called a multidimensional malaise. It is for this reason that research is the right response for better prevention strategies and more reliable investigation processes.

Risk Factors of Suicide

There is no singular cause of suicide. Its occurrence is much like the Swiss cheese model of accident causation: although there are strata of defences between hazards and accidents, there are faults in each stratum that, if aligned, can allow the accident to happen (Reason, 1990). In suicide, much like in any other subject in life, there are positive and negative variables which imbue themselves, in balance or imbalance. In suicidology, there are risk factors and protective factors. When protective factors position themselves between risk factors, a balance of life is created. If and when these protective factors are minimised or not present, the chances that risk factors align to create an imbalance of life are increased. With an imbalanced alignment of risks, suicide may result, possibly as a reactionary wish to re-balance life's positiveness. The degree of alignment of risk factors may be the guiding factor as to how far the person would need to balance negativity, and hence the degree of manifested suicide behaviour; be it simply ideation or more profoundly suicide attempts or in its extreme, death by suicide.

Early research in suicidology focused on risk. This was driven by necessity as there were an immediate need to understand what suicide is and formulate preventive strategies. The emphasis was more on definition and the independent outcome of each of the identified risk factors, rather than on the relationship risk factors have to each other and to other significant life events (Emergency Nursing Resources Development Committee, 2012).

The identification of these risk factors was essential, both for the immediate intervention required but also in a broader manner, for effective suicide prevention (WHO, 2012). Naturally, with the identification of risk came assessments to quantify such risk. The advent of these suicide risk assessments galvanised the idea that some factors in life pose a higher risk of suicide than others. It was also noted that other factors are protective and reduce risk. The list of risk assessment instruments developed over the years is extensive. Runeson et al. (2017) identified 35 such assessment tools. Suicide risk assessments range from those designed to be employed on the general population, like the *Scale for Suicide Ideation* (Beck, Kovacs & Weissman, 1979), to those targeting a specific population like the Harkavy-Asnis Suicide Scale (Harkavy & Asnis, 1989), which is designed for use on adolescents and young adults.

On closer analysis of these assessment tools, even though each instrument may promulgate different risk factors, it is the methodology that is most often altered and not the risk factors, as these seem to be common in many of the assessments (Franklin et al., 2016).

Research has a yet to identify comprehensively what constitutes and what triggers suicidal behaviour. It is true that risk is something fluid in nature (Simon, 2002), and what can constitute an increased risk for one individual can result in a diminished risk in another (Fowler, 2012). It is also true that there are so many variables that affect risk, including culture, life-events, relationships and other social factors. It is therefore prudent to evaluate the common risk factors not as a comprehensive or exhaustive list, but as indicative of the most commonly reported ones (Pompili, 2012). More so, risk assessments are based on active research and most have been updated (Menon, 2013) influenced by theories which have developed over the years. Theories of suicide are

rooted in various approaches, be it Durkeim's Sociological Theory of Suicide (Durkheim, 1897), Joiner's Interpersonal Theory of Suicide (Joiner, 2005), Nock's Ideation to Action Model (Nock, Kessler & Franklin, 2016) or any of the other theories of suicide. Each theory focuses on specific risk factors which, according to the model used, increase or limit suicidal behaviour. Such multiplicity may, however, be detrimental to suicidology in general, as the subject is not gearing up into one or more over-riding paradigms but remains split into single theories which may be inaccurate or situation-specific (Franklin et al., 2016).

The analysis of risk factors and the use of risk assessments are essentially utilised by professionals to predict whether a person would manifest suicidal behaviour or an intention to die by suicide (Perlman, Neufeld, Martin, Goy, & Hirdes, 2011). The aim of such assessments is therefore to increase our capacity in understanding suicide and improve our prediction of suicidal behaviour, particularly in the short term (Kokkevi, Rostika, Arapaki, & Richardson, 2012).

Not all suicidologists concur. Some argue that predictability is limited, and can be inaccurate and problematic, as suicide is not so common and thus offers low base rates. This can have a negative impact on reliability. (Beautrais, 2004; Large, Sharma, Cannon, Ryan & Nielssen, 2011). Bryan and Rudd (2006) suggest that rather than predicting suicide, risk assessments should be utilised to estimate risk in order to provide better clinical management. For such reasons, recently, clinicians and researchers developed *Risk Factor Guidelines* (for example, American Association of Suicidology, 2015; National Institute of Mental Health, 2015). These typically include *risk factors* and *warning signs* (Franklin et al., 2016). The two are not the same; whilst warning signs are an indication that a person may be at an immediate risk of suicide, risk factors indicate that a person may be at a higher risk of completing suicide, not necessarily in the immediate future, when compared to others in a similar or identical context (Rudd et al., 2006). In simpler terms, risk factors for suicide like prior attempts or depression put someone at a higher risk of suicide but warning signs like threatening suicide or seeking the means to die by suicide indicate the suicidal behaviour or intent to die by suicide immediately.

Sometimes Risk Factor Guidelines are criticised for being inconsistent and for providing conflicting judgments but this has to be taken in context.

This may stem from our concept of prediction and risk assessment. Many times, clinicians are expected to predict a patient's suicidal level. It comes from the legal concept of foreseeability. In such a scenario as suicide, where as already indicated, there are low base rates, reliability would be an issue. This legal expectation that clinicians may precisely predict suicide has influenced how suicide risk is managed and the standard of care offered in clinics and hospitals.

The inability to precisely predict suicide does not mean that risk factors that vary in the degree of effect have not been identified. A clinician should not be predicting risk but rather recognising at which level of risk the patient might be and respond accordningly (Bryan & Rudd, 2006).

Other researchers and practitioners maintain that risk factors should be distinct from risk prediction, as current assessments are too weak and potentially dangerous due to their lack of accuracy. Some argue that the risk factors found in different assessments are weak indicators of suicide as they are quite common in clinical practice. They may therefore seem to give false pretences of prediction (Chan et al., 2016).

Ascribed to these pretences is the fact that most research on risk factors of suicide is drawn from attempts rather than from suicides (Holma et al., 2010). Considering that risk factors for suicide and suicide attempts have been established to be different (Park et al., 2018), important predictive information is being lost by concentrating on suicide attempts rather than on suicides (Chen et al., 2013, Isometsä, 2014).

What are Risk Factors?

It seems that the terms risk, risk factors, correlates, causal risk and similar jargon have often been used interchangeably and inconsistently (Kraemer et al., 1997). As in other areas, confusion about terms and nomenclature can lead to miscoordination between professionals and researchers. The *risk factors typology* proposed by Kraemer et al.

(1997) defines a *correlate* as a factor that is associated with another factor or factors. This association can take many forms and even though it indicates a relationship, it does not specify the type. For example, people who die by suicide or attempt to do so tend to show symptoms of hopelessness, therefore one can say that hopelessness is a correlate of both attempted suicide and suicide; however, it does not show how or why hopelessness and suicide are correlated.

A risk factor has been defined as a "special type of correlate" (Kraemer et al., 1997; p. 340) that precedes the outcome of interest and can be utilised to distinguish between high-risk and low-risk. A risk factor is something that increases risk, whilst a protective factor is something that may mitigate risk. To continue with the same example given before; if people showing signs of hopelessness are more likely than others to attempt suicide, then hopelessness is a risk factor of attempted suicide. If this precedence cannot be ascertained, then it cannot be called a risk factor but a *concomitant* or *consequence.* A risk factor can change or morph, either naturally or by consequence of any action by the subject, hence - for example - hopelessness can changed by psychological intervention but age changes naturally. These can be called *variable risk factors*. However, some risk factors like race, gender, date of birth and place of birth cannot be altered, and can thus be called *fixed markers*. Since a variable risk factor can be altered, it can be manipulated and can thus be a *causal risk factor* since it can change the outcome of interest. Variable risk factors, which even though manipulated do not change the outcome, can be called *variable markers*. To further continue using the same example; since hopelessness can be manipulated by psychological intervention, then it can be considered as a causal risk factor of suicide. The distinction between the terms is crucial; causal risk factors can potentially be strong predictors of suicide, and can be beneficial in terms of treatment management, whilst others are weak predictors and most often ineffective if relied upon in treatment management (Kraemer et al., 1997).

Fixed Markers of Suicide.

Sex, gender, race and family have been identified as risk factors which through Kraemer et al.'s typology can be said to be fixed markers of suicide. These factors, particularly sex and race, are stable throughout life. Family membership may be particular in that it can be a factor that increases risk but can also serve as a protective factor of suicide.

Sex and Gender

Society may typically recognise two genders, males and females, but this is merely a biological definition (Lindsey, 2015). Gender refers to the psychological and socio-cultural traits that makes one masculine or feminine. Whilst sex is a natural ascription, gender is learnt, even though the two terms are most often used interchangeably. This very simple distinction is, however, too complicated in practical terms, and weighs in on many of the differences between males and females (Marecek, Crawford & Popp, 2004).

It is well documented in research that gender is a significant socio-demographic correlate of suicide (Zhang, McKeown, Hussey, Thompson & Woods, 2005). It is also well recognised that in Western societies, whilst men are more likely to die by suicide (Moscicki, 1994; Maris et al., 2000; Gold, 2006), females have higher rates of suicide ideation and attempts (Canetto & Lester, 1995; Gold, 2006). It has been reported that globally the rate of suicide is 1.8 times higher in males than females (WHO, 2018). This is, however, more bound to gender rather than sex, even though they intersect (Fenstermaker & West, 2002).

This gender paradox in suicide has been attributed to different elements. One of the most researched explanations is based on the sociological concept of masculinity versus femininity and the theory of social constructs. This approach emphasises that gender roles are created by society and culture (Marecek, et al., 2004). These roles are "assigned" to each gender and idealised as the appropriate behaviour of being either male or female. These roles are therefore regulated by social norms, which are created to guide all members of that society how to behave in specific situations (Lindsey,

2015). This regulation starts early in life. Research has found that by ten or eleven years of age, behaviours according to gender norms are already deeply instilled in males and females (Blum, Mmari & Moreau, 2017).

As these gender roles and typecasts are the product of social and cultural requirements, these are adapted over time according to social and cultural development (Levant & Alto, 2017). The traditional masculine stereotype tends to emphasise independence, strength, aggression, power and risk-taking behaviour, whilst the female stereotype is more docile, passive, affectionate and self-less (Prentice & Carranza, 2002; Schrijvers, Bollen & Sabbe, 2011). For example, lethality, an element required in suicide, seems to fit better in the proactive male stereotype than in the passive feminine typecast. This may be reflected in the choice of methods of death which are usually more lethal and violent in men (Callanan & Davis, 2012). Men tend to shy away from seeking assistance when in distress, with this seemingly fitting better in the female stereotype (Courtenay, 2000). Both facts may be contributing factors for the elevated male suicide rate (Möller-Leimkühler, 2003), and for the under-reporting of male suicide ideation, behaviour and attempts (Cannetto, 1997). Research has indicated that men who strongly adhere to the masculine-feminine dictum are at greater risk of having health problems (Eisler, 1995) and of attempting suicide under duress than men who are more casual in their approach to gender stereotypes (Houle, Mishara, & Chagnon, 2008).

From a young age, gender roles add stress to each and every child. Children as young as six try to appease their family and peers (Bussey & Bandura, 1999) and want to be like others of their gender even if their natural choice would have been different (Sun & Yu, 2016). Men, expected as they are, to be stronger and independent, tend to have more stress related to performing in their gender role than females (Cannetto & Sakinfosky, 1998). The notion “Boys don’t cry”, adopted recently by the American Psychological Association to promote awareness against the negative impact of putting pressure onto our children to adhere to stereotypes, is a prime example. The notion that boys do not show their feelings perpetuates into adulthood; mourning, for example, has been found to be more stressful in men than in women because of this (Doka & Martin, 2010). Research suggests that in stressful events like the loss of a loved one, men are more

likely to grieve alone and in silence than open up their feelings to others due to the perceived social expectation that men should keep going even when it is difficult to do so (Black, 1991). Men are also more likely than females to increase lone activities as means of distraction, or to engage in risk-taking behaviour such as drinking as a form of expression of grief (Canetto & Cleary, 2012). This is also reflected in widowhood; females tend to maintain familial connections after losing their husband more than men do after losing their wives (Stack, 1990). This may be related to the fact that men tend to restrict their network of close family and friends when they feel vulnerable even though such a social support network is a protective factor of suicide (Sullivan & Fenelon, 2014).

In an ever-evolving society, gender roles and stereotypes related to income and employment status have changed. We are moving out of the perceived social expectation that men are "breadwinners", whilst females are "homemakers" and therefore should provide for themselves and their families (Möller-Leimkühler, 2003). Recent research has shown that this is being reversed but in itself may still create higher levels of stress in men particularly when income and employment disparity occurs during the relationship and not at its onset. The same research indicates that being a sole breadwinner is stressfull for both men and women (Syrda, 2019).

Gender Identity and Sexual Orientation

As already mentioned, gender refers to an identity acquired through social norms, roles and stereotypes. It has been argued that gender identity is not a fixed marker (using Kraemer et al.'s typology) as it is not stable (Diamond & Butterworth, 2008). At different stages in their lives, some people feel that their learnt gender identity does not correspond with their biological sex, and thus opt to undergo treatments and some even consider and perform major surgery to have their "wrong" body corrected to correspond to their gender identity. Others, even though assigned to one sex or the other are born with abstruse sex characteristics and develop gender identity related difficulties. Recent research indicated that transgender persons are at a higher risk of

suicide (Johns, et al., 2017). The risk of suicide is even higher in transgender persons who are exposed to some form of conversion therapy, be it conducted in a religious environment or in a professional manner (Asscheman, et al., 2011; Turban, Beckwith, Reisner, & Keuroghlian, 2019).

Sexual orientation is not to be confused with gender identity as the two, even though they may intersect, are distinct; whilst gender identity is a socio-cultural assertion, sexual orientation is more biological (Lamanna, Riedmann & Stewart, 2014). It has been argued that the two identities may not necessarily result in two distinctions; male or female and homosexual or heterosexual. A lesbian has first to assert herself as a female in order to assert herself as a lesbian (Diamond & Butterworth, 2008). Sexual orientation is complex and it can be quite difficult to study it independently and thus ascertain its risk to suicide. Research has consistently suggested that gay, lesbian, bi-sexual and transgender populations report a higher risk of suicide ideation and behaviour and attempts (King, Semlyen, Tai, Killapsy & Osborn, 2008; Haas et al., 2011). The association sexual orientation may have with suicide and attempted suicide has, however, remained inadequately explored. The studies produced mixed results and most did not find an association between sexual orientation and an increased risk of completing suicide, even though there was an association between sexual orientation and suicide attempts (Shaffer, Fischer, Hicks, Parides & Gould, 1995; Renaud, Berlim, Begolli, McGirr, & Turecki, 2010). Examining the discrepancies between the studies, Plöderl et al. (2013) concluded that this was due to methodological bias and that, in fact, being part of "sexual minorities" increased the risk of suicidal ideation, attempts and death.

Race, Ethnicity and Immigration

Race and ethnicity are two risk factors for suicide which are increasingly being examined in recent years (Abbot, 2016). This may be due to the growing phenomenon of modern migration. Research has, however, been tied to the better understanding of mental health issues among minorities and how these affect suicidal ideation and

behaviour. The link race may have to suicide remains somewhat obscure, except for some epidemiological studies (Sherman, D'Orio, Rhodes, Gantt Johnsson & Kaslow, 2014). Studies have suggested that when compared to native populations, immigrants of different racial or ethnic origins show higher rates of mental health issues including depression, but conclusions from different studies have been inconsistent (Lindert, Ehrenstein, Priebe, Mielck & Brähler, 2009; Heredia Montesinos, Heinz, Schouler-Ocak, & Aichberger, 2015). Some studies found that there is no difference (Kessler, Berglund, Borges, Nock & Wang, 2005), whilst others found that migrants fare better than natives (Escobar, Nervi & Gara, 2000). These incongruous findings may be indicative of the fact that suicide risk factors vary between and within racial or ethnic minorities (Al-Sharifi, Krynicki, Upthegrove, 2015). This strengthens the notion that the anomalies in results were due to different races and ethnic groups being considered as homogenous or as a unitary classification in research (Perez-Rodriguez et al., 2008). Studies have shown that even one community cannot be held as homogenous, let alone different communities and ethnicities. An illustration of this is found in a German study which examined suicide rates of Turks living in Germany. It was found that Turkish immigrants died less by suicide than native Germans, but Turkish adolescent girls aged ten to seventeen (naturally having a varied socio-cultural heritage than the immigrants) showed a higher risk when compared to German girls of the same age (Razum & Zeeb, 2004).

Race and ethnicity offer challenges especially when removing oneself from the comfort of being in a one's own native place (where one's own race may be dominant or homogenous) and into another country or place where one's race or ethnicity is a minority (Williams & Berry, 1991). In the process of acquiring new values, customs and beliefs, acculturative stress is created. This has been indicated as a risk factor in the development of suicidal ideation and attempts among migrants (van Bergen, van Balkom, Smit & Saharso, 2012; Wyatt, Ung, Park, Kwon & Trinh-Shevrin, 2015). Acculturative stress has also been associated with discrimination and immigration status, which are also risk factors for increased suicide risk (Forte et al., 2018). Acculturative stress may, in some communities, serve as a coping mechanism by which cultural and moral values are sustained. These are rich protective factors against

suicide, hence the difference in suicidal rates between different races (Oquendo et al., 2005). Results from the same research indicate that Latinos, as a tightly knit community, offer more support to each other thus reducing stress and avoiding suicide. Similar findings were noted in African-Americans, who consider their racial identity positively which reduces mental health issues and suicidality (Sellers, Copeland-Linder, Martin, & Lewis, 2006).

The Family

The family and its moulding effect has been the subject of various studies, in relation to suicide. Familial relationships are fixed markers of suicide (Kraemer et al., 1997), as no one choses into which family one is born. *Blood is thicker than water* is a reflection of the popular belief that family ties are stronger than any other. Research has shown that family ties serve in many ways as protective factors against suicide, and in other ways as risk factors which heighten the risk of suicide.

A positive and close relationship with one's family has been found to be a strong protective factor against suicide (Patterson & Stouthamer-Loeber, 1984; Borowski, Ireland & Resnick, 2001). Parental involvement in children's lives, adequate supervision and sufficient regulation have been associated with better competency later in life (Borowsky, Taliaferro & McMorris, 2013). Without such parental involvement, children tend to be more impulsive, prone to riskier behaviour and inclined to accept peer domination rather than self-regulate (Barber, 2002). Parental bonding has also been associated with higher levels of connectedness, lower levels of depression and lower alcohol use, which themselves are associated with suicidal behaviours and attempts (Goschin, Briggs, Blanco-Lutzen, Cohen, & Galynker, 2013). The role of these protective factors and their interaction with suicidality has not been adequately explored, as there seems to be less interest in protective factors than in risk factors (Bertolote, 2014).

Inversely, many other studies associated the same protective factors with higher risk of suicide when they are in a negative frequency. Children in families where parents over-criticise, constantly disapprove their children's actions or fail to provide harmonious

care, support and nurturance tend to be at higher risk of suicide (Blatt & Homann, 1992; Allison, Pearce, Martin & Long, 1995). This may be due to the internalisation of these negative feelings and the ancillary effect they may have in increasing vulnerability and depression, both of which increase suicide risk (Freudenstein et al., 2011).

These studies have shown that suicide and suicidal behaviour are transmitted within the family but have not shown how this transmission occurs (Runeson & Asberg, 2003). Some studies utilising adoptive and twin siblings have shown that there is a biological and genetic component to this elevated risk, as biologically related siblings have exhibited higher rates of suicide then adopted siblings (Balderssarini & Hennen, 2004).

The biological factor, however, does not explain why family discord, low levels of family bonding and support, and low family cohesion in general have been identified as major risk factors for mental disorders and suicide (Garber, Little, Hilsman & Weaver, 1998; Cash & Bridge, 2009). These elements may be rooted in parental psychopathology, including depression, anti-social behaviour, substance misuse (Brendt, 1995) and mood disorders (Brendt et al., 2015). Gureje et al. (2011) suggested that different parental disorders have different effects on their offspring. Results indicated that parental anxiety was associated with suicide ideation and depression was associated with its persistence, whilst anti-social behaviour increased the risk of suicide attempts (Gureje et al., 2011). Parental panic disorder has also been associated with an increased risk of suicide attempts (Atwoli, Nock, Williams &Stein, 2014). These studies have rightly differentiated between which disorder could increase ideation and which could increase attempts. Other studies have indicated that the transition from ideation to attempt and completion of suicide can be predicted by impulsive-aggressive traits within the family. (Brendt et al., 2002).

Most of these studies statistically adjusted for the disorders they were examining. Generally, they still pointed towards a familial effect for suicidal behaviour, which still persisted after all the statistical adjustments (Brent & Mann 2005). The death by suicide of a member of one's family has been identified as a major risk factor of suicide (Gureje et al., 2011; Atwoli, Nock, Williams & Stein, 2014). This was also noted where a suicide of a close family friend occurred (Bearman & Moody, 2004). Brendt et al. (2015)

reported a five-fold increase in risk for children following a death by suicide of one of the parents, even after adjusting for mood disorder. This reflects what Tsuang (1983) and Agerbo, Nortentoft and Mortensen (2002) had reported. Cerel, Roberts and Nilsen (2005) reported that young adults who were acquainted with a friend who committed suicide were nearly four times more likely to report suicidal ideation and attempt.

This may be rooted in our way of learning by observing and imitating others [a social learning model of acquiring new behaviours] (Amitai & Apter, 2012). Such a cognitive process allows us to imitate behaviour in a social context particularly that behaviour which is either reinforced or coming from a role model (Bandura, 1977). Through this learning mechanism, suicide and suicidal behaviour can be promoted, unknowingly, many times, within the famly, [as in mother and father and siblings, or a close family member] (De Leo & Heller, 2008). This may also be the reason why the death of a family member has been found to pose a higher risk to adolescents and young adults when compared to adults (Insel & Gould, 2008).

Another family-associated risk factor identified in various studies is chid maltreatment and abuse within the family (Esposito-Smythers, Weismoore, Zimmerman & Spirito, 2014). Research has strongly indicated a correlation between childhood abuse and later suicidal behaviour (Roy, 2003, Brodsky et al., 2008). As in the case with parental psychopathology, different forms of child abuse may produce different suicidal behaviours, but it has been acknowledged that more severe abuse causes a larger array of environmental and psychological consequences which are themselves linked to a higher suicide risk (Joiner et al., 2007). Not to be misled, however, and bearing in mind that most often different types of abuse co-exist, one must not focus on specific types of abuse as if examining an independent relationship to suicide, but rather, the holistic interaction between each effect in their relation to suicide should be taken into account (Cicchetti & Rizley, 1981; Kessler, 2002). Taking this approach, Sidebotham and Golding (2001) found that many environmental factors within the family have an effect on future suicidality-related issues, including low socio-economic standing, negative personal relationships and parental loss.

Variable Risk Factors

Using Kraemer et al.'s (1997) *risk factors typology,* a variable risk factor is one that can either be changed or which changes spontaneously. There are two types of variable risk factors; *causal risk factors* which, when manipulated, can change the outcome of interest, and *variable markers,* which do not produce change when altered. The two are distinct in their ability to be predictors of suicide in relation to its treatment; causal risk factors are good predictors of suicide and tend to be highly effective in treatment, whilst variable markers - even though having good predictive validity - tend to be less effective in treatment (Franklin et al., 2017).

Causal Risk Factors

Causal risk factors of suicide are mainly mental disorders which are associated with suicidal behaviour. In Kraemer's typology (Kraemer, 1997) *causal* does not take the form of "creating" or "causing" but rather refers to a modifiable construct which causes change when altered. Causal risk factors, if present, indicate an increased risk of suicide in the person when compared to the general population.

Mental Health

The strongest causal risk factor in suicide is mental illness (Bertolote, Fleischmann, De Leo & Wasserman, 2004). Although not all people who die by suicide have mental health issues, research has shown that there is a very strong relationship between the two (Nock et al., 2008; Bachmann, 2018). Some studies indicate that as many as 90% of people who ideate about suicide and ultimately attempt it or die by suicide have had mental health issues (Arsenault-Lapierre, Kim & Turecki, 2004). However, it has been reported that most of the persons suffering mental illness do not attempt or die by

suicide (Lönnqvist et al. 1995). Some estimate that only around 5 to 8 % of people suffering from mental illnesses die by suicide (Brådvik, 2018).

Although the association between mental disorders and suicide is well established, research has been limited to examining every mental disorder's independent relationship to suicide (Bosktwick & Pankratz, 2000). Varying degrees of risks associated with different mental disorders have been reported (Bertolote et al., 2004), though comparative studies of which mental disorders elevates risk are limited (Gili et al., 2018). Considering that mental disorders are often comorbid (Kessler, Chiu, Demler, Merikangas, & Walters 2005), this path of research has produced a scenario where every mental disorder can be associated with suicide when, in actual fact, its relationship to suicide could be due to comorbidity (Harris & Barraclough, 1997). Some studies have ventured into examining the relationship between mental illnesses and suicide attempts, but few studies have evaluated the comorbidity issue in relation to suicide ideation and completion (Qin & Nordentoft, 2005).

Most of the current data has yet to answer the question about which aspects of suicidal behaviour each mental illness actually predicts. Recent epidemiological studies have suggested that mental disorders are better predictors of behaviours associated with the onset of suicide ideation but not as effective in predicting who of the suicide ideators is actually planning or attempting suicide (Borges et al. 2008). Genetic studies have noted that the occurrence of suicide ideation within families can be explained by the presence of mental disorders but suicidal behaviour cannot (Turecki, 2005). Others suggested that this may be related to distinct genes possibly relating to impulsive and aggressive traits (Bondy, Buettner & Zill, 2006). Despite decades of research, it has yet to be established concretely how each mental illness is related to the distinct stages of suicidal behaviour and how each can predict any phase from ideation to action. Seminal work in this regard has been conducted in the examination of depression and mood disorders.

Depression, Mood and Other Affective Disorders

Amongst the strongest risk factors of suicide are depression and mood disorders in general (Vijayakumar, 2016; Lönnqvist, 2000). Research has indicated that between 2% and 15% of suicides are by persons who experienced major depression (Kessler, Borges & Walters, 1999). Depression is characterised by sadness, inner tension, reduced sleep, appetite and concentration, lassitude, inability to feel, being pessimistic and having suicidal thoughts (Montgomery & Åsberg, 1979). In addition to these, more recent research has found that more depressive symptoms including hopelessness, guilt and low self-esteem affect the degree of suicidality in persons already ideating about suicide (van Gastel, Schotte & Maes, 1997). Depression is the most common mental health disorder in the general population (Kessler et al., 1994) and in persons who die by suicide (Hawton & Van Heeringen, 2009). Depression is often chronic in nature, and hampers and impairs a good quality of life (Daly et al., 2010).

Distinctive stressors activate parallel and precise responses in the body. The endocrine system is adjusted for stress fluctuation, but the over-use of such responses may cause depressive moods (O'Keene, 2000). This is demonstrated by various replicated studies of the hypothalamic-pituitary-adrenal (HPA) axis which confirmed the role its overactivity has in major depression (Varghese & Brown, 2001; Keller et al., 2017). The same processes may also be related to cognitive performance (Rock, Roiser, Riedel & Blackwell, 2014) and other serious medical conditions such as cardiovascular disease (Azevedo et al., 2008) and diabetes (Menke, 2019). Abnormal HPA axis function may also be rooted genetically or may be the result of extreme stress during critical developmental stages in childhood (O'Keene, 2000).

Clinical- and general population-based studies have been consistent in their findings that self-reported depression and mood disarray predicted suicide attempts (Goldston, Reboussin & Daniel, 2006). In another study of high school students, depressive symptoms like insomnia, reduced concentration and hopelessness were found to be correlated to suicide attempts and worthlessness was found to be correlated to distant future suicide attempts (Nrugham, Larsson & Sund, 2008).

Research suggests that mood disorders and depression are very often comorbid, not only with other affective disorders particularly bi-polar and anxiety disorders (Mars et al., 2014) but also with other clinical features including substance abuse (Carter, Issadikis & Clover, 2003) and hopelessness (Ribeiro, Huang, Fox & Franklin, 2019). Comorbidity with any other mental illness has been found to increase the risk of suicide (O'Connor, Smyth, Ferguson, Ryan & Williams, 2013; Veisani, Fathola, Mohamadian & Delpisheh, 2017). Other factors have also been identified to further increase the risk of suicide posed by depression; some studies indicated the severity of depressive episodes (Handley, Rich, Davies, Lewin & Kelly, 2018) and others indicated the length of the depressive episodes (Sokero, Melartin, Rystsälä & Leskelä, 2005).

Bipolar Disorder and Schizophrenia

Suicide risk in persons with bi-polar disorder is complex. It is not constant, and fluctuates according to the phase the person is in. The risk of a suicide attempt increases eightfold during major depressive episodes when compared to a normal phase. It was reported that most suicidal acts occur during major depressive episodes or during mixed episodes which happen simultaneously with other comorbid disorders (Isometsä, 2014). The time spent in severe depression has actually been identified as a determining factor for remission and of the overall risk for suicide among persons diagnosed with bi-polar disorder (Valtonen et al., 2008).

Schizophrenia is characterised by a limited ability to function well within an organised society. People with schizophrenia are typically unemployed, and many show poor physical health (Morgan et al., 2010). Substance abuse, including alcohol and drug consumption, is also common (Moore et al., 2012). All these elements impact on the general well-being of the person and contribute to higher rates of depression and hence elevate the risk of suicide (Bosanac & Castle, 2012). Research has indicated that persons suffering from schizophrenia are 13 times more likely to die by suicide than the general population (Saha, Chant & Mc Grath, 2007), with nearly 5% of individuals with schizophrenia completing suicide at the onset of the illness (Palmer, Pankratz & Bostwick, 2005).

Anxiety Disorders

Anxiety disorders may manifest themselves early in life (Kessler, Berglund, Demler, Jin, & Walters, 2005) possibly because they can be the result of genetics (Kendler, Heath, Martin & Eaves, 1987). Research has shown, however, that anxiety disorders are more commonly transmitted through the family and other environmental factors (Bradley, 2001; Tidelmalm, Langstrom, Lichtenstein & Runeson, 2008). It has been found that children with anxiety disorders were more likely to have at least a parent manifesting the same disorder (Lieb et al., 2000). Studies on adults have found the same patterns, with the same specific anxiety disorder, many times manifesting in other direct relatives (Stein et al., 1998).

From a young age, children exposed to anxious behaviour by the parents tend to avoid emotionally challenging situations furthering their maladaptive ways of managing feelings and reducing their capacity to cope with arduous situations (Bradley, 2001). This model of learnt behaviour is quite stable and when anxiety disorders are not controlled, they tend to stay with the person throughout adulthood and beyond (Prenoveau et al., 2011).

Anxiety disorders are highly comorbid and to a lesser extent with other mental illnesses (Costello, Mustillo, Erkanli, Keeler & Angold, 2003). Anxiety disorders are inclined to cluster tightly with their comorbid disorders more than other disorders do (Krueger, 1999). As a matter of fact; a person is rarely diagnosed with one anxiety disorder (Angold, Costello, Farmer, Burns, & Erkanli, 1999), but rather this is often accompanied by one or more of depression, hopelessness or impulsivity (Mann, Waternaux, Haas & Malone, 1999). Given the tight relationship anxiety has with its comorbid disorders, which independently increases the risk of suicide, the question is whether anxiety disorders independently increase such risk or whether it is the comorbid relationship that does.

Different studies produced mixed results; some studies found that obsessive-compulsive disorder (OCD), post-traumatic stress disorder (PTSD) and generalised

anxiety disorder (GAD) but not panic disorder were independently associated with increased risk of suicide attempts (Goodwin & Roy-Byrne, 2006); other studies found that PTSD and panic disorder were independently associated with suicide attempt (Nepon, Belik, Bolton & Sareen, 2010); still others found that any anxiety disorder increased the risk of suicide ideation and attempts even after controlling for other disorders and increased the risk particularly for those with mood disorders (Sareen et al., 2005). A limitation of all the studies indicated is that results are based on data collected from suicide attempters and thus cannot be completly generalised to those who die by suicide.

Other Clinical Features Related to Suicide

Impulsivity

Impulsivity is a multi-faceted construct encompassing a broad range of behaviours that are most often "rapid, spontaneous, ill-planned, excessive and potentially maladaptive conduct" (Enticott & Ogloff, 2006, p.4). Behaviours such as acting without consideration to consequences, risk-taking behaviours, actions that seek sensation, preference for immediate gratification rather than larger rewards and an inability to restrain oneself to act fast have all been linked to the general concept of impulsivity (Whiteside and Lynam, 2001).

The ability of self-controlling our behaviour is a fundamental social function without which one is disposed to undesirable actions and events. The lack of ability or rather the difficulty in controlling one-self has been attributed to deficits in memory processing and other cognitive functions. It has also been attributed to deficits in personal affect and self-motivational stimulation. These have been separately associated with brain systems connected to behavioural inhibition (Dalley & Roiser, 2012).

Impulsivity has been indicated as a facilitating factor for a person to transit from suicidal thoughts to action (Klonsky & May, 2010). For this reason, it has been utilised

to distinguish between suicidal ideators and those who attempt. Such studies have, however, returned mixed results (Oquendo et al., 2000) and empirical evidence has not satisfactorily distinguished between the two (Klonsky & May, 2010). This may be due to the multidimensionality of impulsivity and its natural bond to other constructs like mood instability and aggression (Gvion & Apter, 2011). These constructs often interact indirectly as even though they would be individually correlated to each other, they would produce different results when any one construct is controlled for. A study by Peters et al., (2015) proposes that although impulsivity predicts suicidal ideation, its effect is altered when mood instability is controlled, suggesting that the correlation may be dependent and occurs indirectly as both variables are independently positively correlated to suicidal ideation.

Cognitive flexibility and resilience are known to be associated with impulsivity in a manner that may affect the executive function of the brain (Nordvall, Stigsdotter-Neely & Jonsson, 2017). A positive association was noted between impulsivity and cognitive flexibility and resilience and a parallel and reciprocal relationship between flexibility and resilience (Ram et al., 2019). This impacts directly on suicide as cognitive flexibility and resilience provides for sound decision making skills, a problem-solving orientation and for the generation of coping strategies in response to regular cognitive challenges. Impulsivity, on the other hand, may interfere with flexibility and resilience by providing for the lack of attentional performance and lack of inhibitory control, both of which contribute to hopelessness and suicidal behaviour in general (Miranda et al., 2012).

Apart from its cognitive aspect, impulsivity has been studied as a personality trait (Brezo, Paris & Turecki, 2006). Personality traits are thought to be more stable and as such their study may be quite useful as a public health concern than other more volatile aspects of behaviour (Savitz, Cupido & Ramesar, 2006). As a personality trait, impulsivity is thought to be a contributing factor in the development of disorders like attention-deficit/ hyperactivity disorder (ADHD) (Menon, Sarkar, Kattimani & Mathan, 2015). Impulsivity has been associated with increased suicide risk in other disorders particularly those involving some form of mania like bi-polar disorder (Swann et al., 2005). Ingrained as it would be as a personality trait, it explains the inability of an

impulsive person to alter or restrain rash responses even when these can be dangerous or have negative consequences (Stautz & Cooper, 2013).

Studies on maladaptive behaviours have often cited urgency as a construct of impulsivity which has the strongest relation to suicide, particularly negative urgency, described as a strong urge to act, particularly in avoiding undesirable physical sensations and emotions (Lynam et al., 2011). It has been shown that this develops in adolescence alongside other psychosocial and neurophysiological developments and as such has been singled out due to its correlation to aggression, violence, compulsive behaviour, substance abuse and risky sexual behaviours, all of which are most often themselves associated with suicide (Berg et al., 2015). It has also been shown that negative urgency has an aggravated impact on persons with depression or personality disorders across both genders (Auerbach, Stewart & Johnson, 2017).

Urgency is only one of the multiple facets of impulsivity. Whiteside and Lynam (2001) propose that impulsivity has three other distinct personality facets; premeditation, perseverance or rather the lack of both and sensation seeking. Premeditation refers to the inclination to reflect on the consequences of one's actions before they ae executed. Impulsive persons usually lack such tendency and act with regard to what follows their actions. Perseverance is associated with self-control and self-discipline and is the ability to remain focused on an aim even if there are difficulties. Impulsive persons usually do not tolerate resistance and distractions and thus get disheartened and stop short of doing what they really want in face of adversity. Sensation seeking is the trait to seek new adventures and experiences that may or may not be dangerous but are surely enjoyable. Impulsive persons usually have more tolerance to dangerous activities and most would seek trilling experiences.

Due to its multidimensionality, the effects of different facets of impulsivity may be diverse and findings from separate studies are many times difficult to generalise. This is more pronounced when other disorders or personality traits are present and thus the relationship is altered.

Hopelessness

"Hopelessness is the subjective assessment of negative expectations on the occurrence of highly valued outcomes, along with the sensation of lack of control over the desired events in the future." (Júnior et al., 2018, p.273). It has been described as the binding and driving force of comorbid mental disorders especially depression and suicidal ideation in a holistic psychological framework leading to suicide (Fraser at al., 2014). In fact, it has been more often cited in accompaniment to depression in suicidal persons (Ribeiro, Huang, Fox & Franklin, 2019) and thus frequently associated with increased risk of suicide (Beck, 1986).

Hopelessness has been associated mostly with increased risk of ideation, attempts and deaths by suicides as different from impulsivity, which has been strongly linked to death by suicide but not to ideation (Zouk et al., 2006; Qui, Klonsky & Klein, 2017). This association has been challenged by Samuelson et al. (2006) who found that hopelessness did not vary between persons who died by suicide after some time of making an attempt when compared to other survivors. Potentially this may have been due to inconsistent use of different scales, which did not comprehensively test for all aspects of hopelessness (McCullumsmith et al., 2013). It may have also been the result of timing of assessment; it has been found that persons who feel hopeless only when depressed are not as likely to harm themselves as others who feel hopeless even when not depressed (Young et al. 1996).

Other factors generally affect the level of hopelessness. In their study on cancer patients, Somasundaram and Devamani (2016) noted that there was a significant relationship between higher levels of resilience and perceived social support and a lower level of hopelessness. Social support has long been associated with alleviating psychological distress. Other studies support this notion and indicate other constructs like temperament, attachment and perseverance which mediate the relationship between hopelessness and suicidality (Laird, Krause, Funes & Lavretsky, 2019).

Variable Markers of Suicide

Variable markers of suicide may be considered as correlational or circumstantial risk factors of suicide. On their own, these factors may not pose a significant risk but their combination with causal risk factors often increases the potential risk of suicide. These factors, unlike others, have been found through research to be related to suicide because of their compounding effect with causal risk factors, and therefore their management may be crucial when it comes to suicide risk mitigation. Variable markers do not have the capacity to alter the level of risk of suicide on their own, but their management as part of a wider behavioural manipulation with causal factors could prove useful in risk mitigation.

Marital Status

Marital status was identified as a factor related to suicide early in the study of the subject. Morselli (1882) and Durkeim (1897) both argued that married men were less likely to commit suicide than unmarried men. Morselli found that widowhood and divorce were associated with a higher risk of suicide in both genders, whilst Durkheim further noted that widows had a higher risk of suicide then others who never married.

All the research that followed did not find fault with these statements even when considering how marriage and relationship patterns changed from the time of Morselli and Durkheim. Marriage breakdown has been associated with higher psychological distress (Maughan & Taylor, 2001). Widowhood, divorce and unmarried statuses are all associated with a higher risk of suicide (Smith, Mercy & Conn, 1988; Luoma & Pearson, 2002).

The effect marital status has on males and females, however, differs. Rates of suicide in divorced and separated men are higher than in divorced females (Wyder, Ward & Di Leo, 2009; Liu et al., 2013). Widowhood too seems to have a far greater negative effect on men than women, and poses a higher suicide risk in males (Yamauchi et al. 2013).

Although these findings came from different countries and may thus seem universal, the difference in ratios between collectivist and individualist cultures seems to indicate that other factors may affect the relationship between marital status and suicide. Collectivist cultures are more likely to be moralistic and conservative (Schwatrz, 1994) and thus marriage may increase the subjective well-being of individuals as opposed to the stigma of being unmarried. (Diener, Gohm, Suh & Oishi, 2000). Secondly, collectivist cultures offer more support within the family and as a group (Triandis, Buontempo, Villareal, Asai & Lucca, 1988) which in itself has been found to reduce the risk of suicide. (Ariapooram, Heidari, Asgari, Ashtarian & Khezeli, 2018).

Friends and Social Affiliations

Social affiliations and support have been found to promote health and wellbeing and thus reduce the risk of mental health issues and the risks these bring with them (Antonucci & Akiyama, 1987). Social support has been generally divided into two broad domains: *Structural* support refers to being part of social networks, of friends, family and others and the intensity by which the support exists, including the amount and quality of time with others. *Functional* support is the type of support offered or, as importantly, perceived to be on offer (Schwarzer & Knoll, 2007). The best example of functional support is emotional sustenance (Uchino, 2004), which makes a person feel cared for, accepted and loved (Langford, Bowsher, Maloney & Lillis, 1997), thus reducing the risk of suicide ideation and attempts (Kleiman & Liu, 2013). Functional support has been divided into "received functional support" and "perceived functional support". It has been found that the perception of receiving support or of the availability of that support is as important as actually receiving it (Reblin & Uchino, 2008).

Social support has also been associated directly to the mitigation of suicide risk in negative life events such as bereavement (Ariapooram et al., 2018) and intimate partner violence (Meadows, Kaslow, Thompson & Jurkovic, 2005), by sustaining resilience which is a strong protective factor in suicide. (Kleinman & Liu, 2013; Harper, Bruce, Hosek, Fernandez, & Rood, 201)

Religion and Spirituality

Religion has been a force that has written history and exerted an influence on everyday life and death. It has moulded the way we live today, even though its influence may seem to have waned. Throughout literature, religion has been referred interchangably with spirituality, which is a more personal belief (Gearing & Alonzo, 2018). Religion can equip a person with hope and allows anyone to trust in divinity amongst other things. Religion's best contribution has, however, been the support it rallies as an organised faith community. Religion offers integrative benefits similar to the social cohesion proposed by Durkheim (1951). It also offers moral imperatives that in all major religions are against suicide (Stack & Lester, 1991).

Membership and participation in a religious group and its association to suicide has been researched, but the results have been mixed. Some studies found religion to be a protective factor against suicide (Stack & Kposowa, 2011; Nkasah-Amankra et al., 2012; Rushing, Corsetino, Hames, Sachs-Ericsson & Steffens, 2013). Others found no association between religion and suicide (Chatters, Taylor, Lincoln, Nguyen, & Joe, 2011; Stroppa & Moreira-Almeida, 2013), and still others have found that religion increases the risk of suicide (Xie et al, 2012; Lawrence et al, 2016).

The difference in findings may lie in the conduction of these studies and could be the result of definitional differences; some studied the attendance at formal religious activities only, others studied the subjective importance given by a population through standard assessment tools like the Reasons for Living Inventory (Linehan, Goodstein, Nielsen & Chiles, 1983).

Religion and spirituality have been included in many suicide prevention programmes as, potentially, religion can provide coping mechanisms in response to life stressors, provide social support, teach members to restrain themselves on dangerous behaviour and possibly influence its followers on the negative repercussions of suicide through its teachings (Gearing & Alonzo, 2018). These results seem to be somewhat affected by the cultural context and thus should be considered through the current social and religious environment in order to be effective suicide prevention tools (Wu, Wang & Jia, 2015).

Smoking, Drinking, Drugs and Gambling

Substance abuse, including use of prescription or illicit drugs, smoking and alcoholism, together with gambling have all been associated, independently and together, with an increased level of suicide risk. Smoking is not only a leading cause of premature deaths, but also a leading factor associated with disease burden (Jonas et al., 2014) and a higher risk of suicidal behaviour (Oquendo et al., 2004). The association of smoking with death by suicide goes back to Paffenbarger, King and Wing (1969), but can be said to have been confirmed by two metanalysis conducted independently by Li et al. (2003) and by Poorolajal and Darvishi (2016). Whilst in the first study a statistically significant association was made between smoking and dying by suicide, in the second study an association was made between smoking and all aspects of suicidal behaviour, including ideation, planning, attempt and death by suicide.

Smokers are also more likely to drink alcohol than others who do not smoke (Icick et al., 2017; Jung, 2019). In two studies conducted between 2003 and 2011, it was noted that when one either consumes alcohol or smokes tobacco, the risk of suicide increases slightly. When undertaken in combination, the risk is much higher than when either one of tobacco or alcohol is consumed (Hemmingsson & Kriebl, 2003; Schneider et al., 2011).

Alcohol consumption is not only associated with more than 60 diseases and injuries (Pompilii, 2010) but also with suicidal ideation, suicide attempts and suicides (Martinotti, Lupi, Santacroce & Di Giannantonio, 2014). This is not only true for those with an alcoholism problem, as even a minor rate of consumption has been found to elevate the risk of suicide (Borges et al., 2016). In the short-term alcohol has a profound effect on the mood, both when consumed and during withdrawal (McManama O`Brien, 2014). It lowers inhibitions, clouds judgement and increases impulsivity (Pompilii, 2010), and as such increases the risk of suicide by easing the distress that a decision to end one's life can produce (Olson, 2012). Furthermore, it has been noted that more lethal means of suicide have been used by persons who are intoxicated at the time of suicide (Sher, 2006). In the long term, alcohol addiction and dependence can increase

depression and social withdrawal, thus further increasing the risk of suicide (Hufford, 2001).

Problem gambling, a behaviour just short of clinical pathological level, is an addictive behaviour highly comorbid with alcohol and smoking problems (Petry, Stinson & Grant, 2005). The close association between alcohol and tobacco use has already been indicated. Problem gamblers have been found to be prone to be heavy alcohol and tobacco users too (Petry, Stinson & Grant, 2005; Weinberger et al., 2015). The mechanism of how this tri-partisan association functions has yet to be studied, but a common construct between the three is impulsivity (Andrade, Alessi & Petry 2013). Yip et al. (2011) found that gambling, even in a moderate manner, was associated with increased use of marijuana and designer drugs like ecstasy, whilst also increasing alcohol and tobacco consumption. These findings were similar to those found by Ellenborgen, Derevenskly and Gupta (2007). The results of the last two indicated studies also suggested that substance abuse increased proportionately with the severity of the gambling problem, especially when the onset is in adolescence.

Gambling has been associated with anxiety, depression and low self-esteem (Gupta & Derevensky, 1998). Adolescent problem gambling has been associated with higher delinquency and increased risk of alcohol and drug addiction (Splevins, Mireskandari, Clayton & Blaszczynski, 2010; Blinn-Pike, Worthy & Jonkman, 2010). Gambling has also been independently associated with suicide ideation, plans and attempts (Maccallum & Blaszczynski, 2003; Grant, Derbyshire, Leppink & Chamberlain, 2014). Whilst these studies found no differences across genders, Feigelman, Gorman and Lesieur (2006) found that only female gamblers had significantly higher rates of suicide thoughts and attempts.

Education, Employment and Income

The significance of education, employment and income for suicide is not clear in the literature. Mixed results were obtained from research, particularly on education and

income, possibly because their relationship to suicide varies depending upon other factors.

Whilst Pompili et al. (2012) found that persons who died by suicide between the age of 15 and 64 were significantly more often to have a higher education level than their same-age counterparts, other studies found that higher education levels decreased the risk of suicide (Flavio et al., 2013; Ishtiak-Ahmed, Perski & Mittendorfer-Rutz, 2013; Bálint, Osváth, Rihmer & Döme, 2015). Research conducted in Scandinavian countries, Mäki and Märtikainen (2009) confirmed Pompili's findings only for females but not for males. This is possibly because the perceived benefits associated with higher education - that is; better employment with higher income - depend on future employment, a promise that is more likely to be attained by men than women because of family commitments (Bálint et al., 2015) or because men attain better social integration than women (Denney, Rogers, Krueger & Wadsworth 2009).

Research seems to be in agreement in its findings about the association between employment and the risk of suicide. Statistically significant associations have been reported between unemployment and suicide ideation (Hiswåls et al., 2015), suicide attempt (Kraut & Walld, 2003) and death by suicide (Kposowa, Ezzat & Breault, 2019). Unemployment has been independently associated with depression (Jefferis et al., 2011) and anxiety (Molarius et al., 2009) particularly in economically stressful situations (Triantafyllou & Angeletoloulou, 2011).

A common theme found in literature regarding the association of employment and suicide is job stability. Unstable employment has been found to be associated with a higher risk of suicide (Kim, Ki & Cho & Song, 2017). This was mainly due to its proximity to various mental health issues like hopelessness, feelings of social exclusion and lowered self-esteem normally related to suicide (O'Connor & Nock, 2017).

Research has been conducted to establish which occupations, if any, are at higher risk of suicide. A meta-analysis conducted in 2013 concluded that occupations requiring low skills like operators and laborers were at the highest risk of suicide due to their employment, whilst those requiring high skills like managers and clerical staff showed

the lowest rates of suicide. An exception to this were healthcare professions, farmers and police (Milner, Spittal, Pirkis & La Montagne, 2013).

Unemployment and unstable employment can have a tremendous impact on the income of anyone. The expectation of insufficient income because of unemployment has been associated with increased risk of suicidal behaviour (Yur'yev, Värnik, Värnik, Sisask & Leppik, 2010). Lower income has been found to be associated with a higher risk of suicide, as has lower socio-economic status in general (Lee, Oh, Jeon & Roh, 2017). The greatest impact related to the association income has with suicide has, however, not been noted in having a lower income but in income inequality (Hiyoshi, Kondo & Rostila, 2018). Lower income and income inequalities have both been linked to a higher risk of anxiety, particularly over life problems like indebtedness and rising housing-related problems, which are themselves risk factors for suicide (Haw, Hawton, Gunnell & Platt, 2015). The continuous welfare downsizing in many countries has resulted in widening the gap between higher and lower income groups which is associated with lower psychosocial health in the latter group (Kondo, Kawachi, Subramanian, Takeda, & Yamagata, 2008).

In their systematic review, Pollack et al., (2007) found that wealth was related to health in general. Other studies found that wealth and financial difficulties particularly debt - related, were associated with mental disorders, depression and a higher risk of suicide ideation (Meltzer et al., 2010) and suicide (Yip et al., 2007; Richardson, Elliott & Roberts, 2013).

Physical Disabilities, Trauma and Chronic Illnesses

Physical trauma is a major cause of death at young age and the most common cause of disabilities thereafter (Bryant et al., 2016). Physical disabilities are those physical impairments and functions that limit social activity, and which often cause difficulties in activities of daily living (Khazem, 2018). In the literature, a distinction is made between a physical disability, as defined here, other disabilities such as autism and Down's syndrome, and other health problems, illness or disease. This has been made as various

studies have noted a difference in the relationship each class has with various risk factors, particularly those associated with suicide.

In general, individuals having some form of physical disability report stigmatisation and disability-related discrimination as their two major concerns (Sutin, Stephan, Carreta & Terracciano, 2015; Neille & Penn, 2015). These outcomes are generally associated with mental health issues including anxiety, depression and post-traumatic stress disorder, (Schweininger et al., 2015; Evans et al., 2018) as well as with a higher risk of suicide ideation, attempts and death (Acheampong & Aziato, 2018).

Adults with a disability have been found to have three times the risk of suicide ideation as their counterparts without disabilities (McConnell, Hahn, Savage, Dubé & Park, 2016). Adults who have a disability which impacted their activities of daily living have been found to have four times the risk of suicide attempt when compared to persons without any disability. Furthermore, persons with more than one disability have been found to be eight times more at risk of attempting and completing suicide when compared to other persons with one disability (Meltzer et al., 2012).

Of the nineteen disabilities investigated by Ahmedani et al. (2017), persons with traumatic brain injury showed the highest suicide risk, followed by persons with HIV/AIDS and sleep disorders. Traumatic brain injury has also been singled out as posing a very high risk of suicide in various other studies (Bryan & Clemans, 2013; Madsen et al. 2018). This may be explained in the light of other studies which showed that, independently, acquisition of a disability by injury increases the risk of suicide. McConnell et al. (2016) reported that when compared to persons with congenital disabilities, persons who acquire a disability are at a greater risk of suicide. This may, in turn, be due to persons with a congenital disability having a better aptitude to adapt, and in general having more life satisfaction and better disability identity than persons who acquire a disability later in life (Bogart, 2014).

Other severe conditions have been associated with a higher risk of suicide when compared to the general population. For example, spinal cord injuries (Savic et al., 2018), epilepsy (Verrotti et al., 2008) and stroke (Kishi, Robinson, Kosier, 2001) have been studied and an association with higher risk of suicide noted.

Like physical disabilities, chronic illnesses have the prolonged effect of permanency. Chronic diseases reduce the quality of life due to health impairment (Megari, 2013), and are thus associated with various psychiatric disorders including hopelessness, anxiety and social isolation (Grandmaison, Watier, Cavard & Charlier, 2014) which are all associated to a higher suicide risk. This comorbidity has a significant compounding effect (Qin et al., 2014) particularly if the comorbidity is a mood disorder (Ferro et al., 2017).

Various chronic illnesses have been independently tested for their association with suicide risk. The most common associations with a higher risk of suicide were hypertension, diabetes mellitus, renal disease, ischemic heart disease and pulmonary diseases (Ahmedani et al. 2017). Quan at al. (2001) were more cautious about the association chronic diseases have with suicide, whilst Webb et al. (2001) explained any association these chronic illnesess may have by clinical depression. As with physical disabilities, having more than one condition increased the risk of suicide (Ahmedani et al., 2017).

Death and Bereavement

Losing a loved one is a most painful experience. Bereavement is always a very particular time in which the survivors are vulnerable to an array of mental conditions. The feelings of sadness, loneliness, loss and being exposed to death are common, and part of the grieving process. These feelings are more pronounced the closer the relationship to the deceased is (Guldin et al. 2017). Studies have shown that these feelings are associated with a range of mental conditions, including depression, panic disorder and post-traumatic stress disorder (Keyes et al., 2014). Grief is universal, and the intense and distressing emotions are usually replaced by adaptive behaviour which allows persons to continue with their lives. However, some do not adapt well and go into a prolonged period of unresolved and traumatic grief (Tal Young, 2012).

Bereavement has been associated with a higher risk of suicide, particularly in the early stages and at the far end later in a prolonged period of grief (Luoma & Pearson, 2002).

Prolonged or complicated grief has been independently associated with higher suicidal ideation (Stroebe, Stroebe & Abakoumkin, 2005).

The circumstances of death have an effect on bereavement. It has been noted that unexpected deaths can involve stronger responses and are associated with a higher risk of mental destabilisation, which can lead to higher depression and anxiety (Burton, Haley & Small, 2006) and increased risk of prolonged grief (Newson, Boelen, Hek, Hofman & Tiemeier, 2011). Other studies noted that survivors bereaving a suicidal death are often burdened with stigma and guilt. Both emotions were not found to significantly increase the risk of suicide in a study which compared persons bereaving a suicide with others bereaving other unnatural sudden deaths (Pitman, Osborn, Rantell & King, 2015).

Suicide is a Multidimensional Malaise

Suicide, being a very private matter, does not manifest itself in the same manner but rather every suicide is a unique performance (Lester, 2015). Some suicides are planned and seem to follow a route common to others. Other suicides seem spontaneous, and do not present any explicit precursors (Canter, Giles & Nicol, 2004). This may lead some to question official suicide verdicts, as many are inclined to think that any risk factor of suicide could be identified and noted by family or friends. One has to note, however, that the absence of overt or explicit risk factors or precursors of suicide does not rule out their presence. On the contrary; research has noted that there are different pathways to suicide (Pridmore, 2010).

It is apparent from what has been written so far in this review that suicide is the result of a complex interaction between sociological, biological and psychological factors (van Heeringen, Hawton & Williams, 2000). The acknowledgement of such interactions has neutralised some questions sought before and made them irrelevant, like, for example, the question as to whether suicide is rooted in any one of the three dimensions. The answer has been in the literature for quite some time. Suicide is a multidimensional malaise (Shneidman, 1977; Leenars, 1996) “with a hierarchy or multiplicity of causes

involving several layers - precipitating causes, secondary causes, sustaining or resonating causes, and primary causes." (Shneidman, 1973, p.385). A pivotal issue in suicidology is the effect each risk factor, stressor or precursor, has on the environment, on the behaviour of others and on other variables and how this interaction ultimately affects the person and manifests itself (Grendas et al., 2019). The manifestation of such interaction and the pathways of suicide have been the subject of various studies (Bryan & Rudd, 2006). Schneidman's psychological autopsy (PA) dominated how most research on risk factors of suicide was conducted (Hjelmeland, Dieserud, Dyregrov, Knizek & Leenaars, 2012). PA was originally designed as a method of examining in detail all the information surrounding unnatural death and the circumstances (Shneidman, 1981). It is a most efficient way to collect information but still has its caveats, particularly regarding the collection of retrospective information from persons other than the deceased or from persons who attempted suicide. These last group may manifest different risk factors than those who die by suicide (Nock, 2017). Most of the studies based on the psychological autopsy system illustrate the association between risk factors as specific; one factor is associated to another in a seemingly solid or straightforward way. Life is, however, more complicated than that.

Two important theorical approaches employed in suicidology counter this notion in favour of multidimensionality: The Multidimensional Approach to Suicide and Facet Theory. The multidimensional approach to suicide has been developed by Antoon Leenars over the last decades (see e.g. Leenars, 1996). It is an expanded form of Schneidman's psychological autopsy, based on protocol sentences from ten of the most influential suicidologists and rooted in the idea of obtaining data on the suicide from the broadest and richest possible sources. This is done by analysing clusters of what are called intrapsychic and interpersonal aspects, ranging from unbearable psychological pain to rejection and aggression (Leenars et al., 2018). Facet Theory, developed by Louis Guttman, (1954) is built on the systematic co-ordination of theory and research by integrating various facets of the same scientific matter. This allows for the construction of hypotheses linking the formal definitional aspects with the practical empirical observations to produce scientific generalisations (Canter, 1985).

In practical terms, Facet Theory allows for the optimal use of data even when this has some weaknesses, as the workings are based on ranked associations between factors, (Canter, 2000) and displayed through structural analysis techniques like multi-dimensional scaling (MDS), small-space analysis (SSA) or partial order scalogram analysis (POSA). These provide a visual understanding of the spatial representations each variable has on its own and when compared to other variables (Guttman, 1944, Guttman & Greenbaum, 1998). This approach was employed successfully in research on suicide conducted by Canter, Giles and Nicol (2004). Employing a SSA, this research strengthened the notion that suicide can follow distinct pathways because certain variables cluster together. It was noted that suicide variables congregated into three clusters related to life circumstances, to suicidal history, and to physical and mental health. It was further noted that not all precursors of suicide manifest themselves to a level that others can notice. This has been attributed to the deceased feelings of hopelessness due to being trapped, which are suppressed and hidden from others (Canter, Giles & Nicol, 2004).

Personal Choices in Death by Suicide

There are many choices a person makes when deciding to die by suicide. Many of these actions can have a personal meaning, but there are also social and cultural influences that affect a person's choices, which are also driven by physical availability and lethality (Kolves & De Leo, 2017). Most studies have focused on gender and age differences when comparing methods of death (Pirkola, Isometsä, Lönnqvist & Jouko, 2003), with other choices like location of suicide and time of death receiving negligible attention.

A Suicide Note

It is quite difficult to say in what percentage of cases globally, a suicide note was left by the deceased as such data is not commonly held. Haines, Williams and Lester (2011) found that in nearly one third of suicides a note was left by the deceased. Some believe

that the study of such suicide notes is important because they provide a picture of the inner self of the deceased at the time of deciding on suicide (Bhatia, Verma & Murty, 2006). Others argue that a suicide note may be part of the masking process of what the deceased really felt (Yang & Lester, 2011). While this can be true, a suicide note can still be considered an important way to understand the lived experience of the deceased (Furqan et al., 2019).

The most common themes in suicide notes are apology and shame (Foster, 2003). Many write about their love of those whom they leave behind, about their hopelessness in the face of illness and about practical post-mortem matters (Foster, 2003). The choice as to whether to leave a note or not and the contents of a suicide note may be planned to have a desired effect on the significant others to whom the note is left (Lester, 2015).

The use of social media may serve as a platform where a "suicide note" is used as a means of attracting attention, as a plea for help and not as a testimony before departure, as suicide notes are many times used. This is important for prevention but may also be an important study in light of recent findings that link increased use of social media with increased risk of suicide (Luxton, 2012).

Method of Death

Suicides have been attributed to various environmental, social and contextual factors and the choices made may depend on these various factors and how they interact. Availability is one of the factors effecting the choice of a specific method (Ajdacic-Gross et al., 2008) but this is not the only influence. Various studies have indicated that the preferred suicide method varies across nations. There is more than one reason for these differences and the study of these differences itself is important to suicidology. Even though there are differences in prevalence of suicide methods between countries and continents, hanging is globally the predominant method for both males and females especially in developed countries. (WHO, 2018). Firearm use is the preferred suicide method in the United States whilst poisoning, most commonly by pesticides, is prevalent in developing countries in Central and South America and Asia (Adjacic-Gross

et al., 2008). Jumping from heights is frequent in highly urbanised countries like Singapore and Hong Kong (Wong et al., 2013) prevalent in cities with many high-rise buildings including New York (Fisher et al., 1993) and Taipei (Chen, Gunnell & Lu, 2009). Despite the differences, some common themes run across research globally including lethality, accessibility and social acceptability of the method of death (Kõlves et al., 2018).

There is a common perception that those who die by suicide must have had stronger intentions to do so than those who survive an attempt. This perception has some root in research (Suominem et al., 2004) but the role intent has in a person's decision to die by suicide remains somewhat unclear. Research linked the intensity of a person's wish to die, usually referred to as intention, with the degree of risk taken by the person to accomplish that wish (Dorpat & Boswell, 1963) effectively linking intentionality with the severity and lethality of the method of death (De Bastiani & De Santis, 2017). Intention has however remained elusive as a suicidal person can have multiple intentions and most often, intentions evolve, obscuring the already ambivalent nature of the concept (Andriessen, 2006) even though intention has been used to distinguish between suicide and other forms of death (De Leo et al., 2006). Various other factors interact in the process of opting for a method of death and not another. Research has shown that accessibility to the location of death and to any required tools, (Farmer & Rohde, 1980) social acceptability of the method of death (Eskin, 2004) and the person's perception of the method's lethality (Brown et al., 2004) may influence the choice of the method of suicide.

Lethality has been defined as "the deadliness of the suicidal act or contemplated act (Resnik & Hathorne, 1973, p.8) but before the onset of the specific study of suicide risk factors, lethality included a person's risk of suicide in the future. A high level of lethality in suicide is considered where a possible rescue or chance not to die when a suicide attempt is undertaken, is minimal or none (De Bastiani & De Santis, 2017). Research regarding the relationship between the level of intent and the level of lethality have returned mixed results. What was established, however, was that the suicidal person's expectations about the lethality of the method of death is positively related to intention

(Beck at al., 1975; Brown et al., 2004). This may imply that the choice of method of suicide is not only made on the inherent deadliness of the method but also on the mere assumption of such deadliness.

A second consideration in the choice of method of suicide is accessibility and availability of the appropriate tools or chemicals to perform such an act as any action that requires technical knowledge would naturally not be open for anyone without that knowledge (Farmer & Rohde, 1980). The question of accessibility is also one of how quick that accessibility is. Given that some suicidal crises are very short, a gun in a cabinet poses a far greater risk than a bridge a short distance away even if both methods are readily accessible, easy to use and equally lethal. A study of medical doctors who died by suicide illustrates this; it was found that self-poisoning by drugs, most often barbiturates, was more frequent in doctors when compared to the general population. It was further noted that half the anaesthetists who died by suicide had utilised anaesthetic agents to do so. The findings support the explanation that availability and accessibility contribute heavily to the choice of suicide method (Hawton, Clements, Simkin & Malmberg, 2000).

The correlation between the means, availability and the method of suicide may be specific and whilst the link between the availability of firearms and a higher rate of suicide in general is not direct, where firearms are available there is a higher incidence of firearm suicides (Carrington & Moyer, 1994). Actions to limit accessibility and availability of means used for suicides has been proved to be effective in decreasing suicide numbers. In a metanalysis of suicide cases in Australia between 1988 and 2007 a change in trend in the method of suicide was noted. A decrease in the number of male suicides was attributed to a decrease in suicides by firearms, carbon monoxide poisoning and chemical poisoning even though there was an increase in suicide by hanging. This coincided with a nationwide effort to control guns, the requirement for all new cars to be fitted with a catalytic converter and a restraint on the prescription of anti-depressant drugs (Large & Nielssen, 2010). Whilst availability and accessibility surely effect the choice of method of suicide, other factors are involved.

Social and personal acceptance of suicide plays a major role in regulating people's perception of suicide as an acceptable way to end one's life (Joe, Romer & Jamieson, 2009). This may be a reason why suicidal behaviour levels vary between ethnic groups and why certain methods are more common in different countries. As an example, one can analyse self-immolation as a method of suicide. It is very common in Iran, the Middle East and South-east Asia, where it is related to religious beliefs (Bidaki et al., 2016) and culturally accepted as a means of protest (Rezaeim, 2013). Self-immolation is not as common in Europe (Gauthier, Reisch & Bartsch, 2014). Acceptability is also affected by gender, race, and religious affiliation (Eskin, 2004). A study of suicide in Australia showed that whilst firearm suicide was the most common method of death in males within the general population, it was not in the indigenous population where over 90% died by hanging, as it is an acceptable method to kill oneself. This is most probably related to colonial oppression, when hanging was used as a punishment (de Leo, Sveticic, Milner & McKay, 2011).

Social acceptability and attitudes towards the method used to terminate one's own life is moulded by, amongst others, the reason why suicide is undertaken or merely the perception of it. For example, the acceptance that people suffering from incurable diseases may resort to suicide (or more recently assisted suicide or euthanasia) has risen in the past decades (Romer & Jamieson, 2003). This has also been translated in the social and cultural acceptance of some methods of suicide (Thomas, Beech & Gunnell, 2013).

Hanging has been shown to be increasing over the years with studies in Australia (De Leo, Dwyer, Firman & Neulinger, 2003), Japan (Dhungel, Sugai & Gilmour, 2019) and the United States (Baker, Hu, Wilcox & Baker, 2013) amongst other confirming this trend. In another study, it was also noted that the increased rate of hanging as a preferred method of suicide was higher in females and that there was a decrease in non-conventional methods for men suggesting that choice of method was affected by social acceptability (Kõlves, Mc Donough, Crompton & De Leo, 2018).

Gender difference in suicide has been primarily highlighted through the methods of suicide and their lethality. Males tend to use more lethal methods to die than women

(Mergl et al., 2015) hence the higher number of males dying by suicide than females. In using less lethal methods of suicide like poisoning, there is a greater chance of being rescued then in cases in which more lethal means like a firearm are used hence the higher number of attempts for females when compared to men. Females also tend to use diversified methods of suicide more than males (Tsirigotis, Gruszczynski & Tsirigotis, 2011). Lethality level has also been noted to be higher for males even within the same method (Cibis et al., 2012). This may indicate that various other factors inter-relate and influence lethality. One of the most pronounced factors is men's averseness to seek assistance possibly emanating from traditional masculine gender roles. (Rickwood & Braithwaite, 1994). These may also include men's lack of emotional expressiveness and higher social isolation particularly in acute crisis (Möller-Leimkühler, 2003). Males also tend to indulge in alcohol and drug use more than females and this is more likely to increase the lethality of suicide attempts due to increased impulsivity and increased effect if present together with mood disorders (Sher, 2006). The effect of drugs and alcohol may be a long-term effect in a way that it affects cognition and not necessarily affect an instantaneous decision to attempt suicide. It has been found that intoxication on the day of suicide was not related to the lethality of the attempt but the use of more lethal methods was more commonly used by frequent drug users (Silveira et al., 2014). It has also been noted that men with a history of substance abuse were more likely to resort to poisoning or drug overdose than other men without such a history. A history of drug abuse however, had no significant impact on females (Callanan & Davis, 2012). Another explanation for the difference in methods of suicide used by males and females is that females, due to social expectations, tend to prefer to die without mutilating their body so consequently choose methods of suicide like substance poisoning that leave their body intact in preference to other methods such a shooting themselves which are deemed more disfiguring (Stack & Wasserman, 2009). This was further confirmed by Callanan and Davis (2011) when they examined suicides by firearms for both males and females and noted that females were more inclined to shoot in the body rather than in the head. The chances of death from a gunshot wound to the head is higher than that to the body (Kposowa & McElvain, 2006). The type of gun used in suicides is also of note, with more men using long fire arms over pistols or revolvers (Stack & Wasserman,

2009). The difference here can be two-fold: long firearms are easier to point to the head thus being more lethal than small fire arms coupled with the fact that longer firearms are more commonly found in higher calibres than handguns (Stone, 2001).

Different results emerged from literature with regards to age as a factor in the choice of method of death. Whilst a study in Korea found that males over 65 years of age tend to use more lethal methods than younger males (Oh et al., 2014), in another study conducted in Europe, whilst confirming that males tend to use more lethal methods than females, there was no significant difference by age (Mergl et al., 2015). A study conducted in Canada denoted mixed results for two lethal methods of suicide; whilst hanging decreased with age, suicides involving a firearm increased with age (Navaneelan, 2017). In Turkey, stable findings were reported with regards to lethal methods in suicides of persons over 65 years old (Demir, 2018). The lack of universal findings may indicate that age is related and perhaps dependent on other factors in its influence on the choice of method of suicide.

Most research has focused on the prevalence of psychiatric disorders among suicides and under-examined the psychopathology and its associations and influence on the choice of method of suicide. One such study found that whilst substance -related disorders were naturally associated with substance poisoning as a method of suicide, psychotic disorders were associated with jumping from heights and patients with bi-polar disorder tend to jump before a moving train. The psychological mechanisms for such preference were however not established (Huisman, van Houwelingen & Kerkhof, 2010). A relationship between violent methods of suicide and psychotic disorders was also noted in Dumais et al. (2005) which also observed that two major behaviours in psychotic patients; aggression and impulsivity were positively related to the method of suicide.

In a systematic review of 53 studies on suicide, other socio-demographic variables were noted to have a certain degree of interaction with the choice of method of death including unemployment, rural life, marital status and education. It was reported that unemployment increased the rate of suicide but did not bear on the choice of method but in rural settings, unemployment resulted in a higher number of violent suicides due

to higher accessibility to tools (Cano-Montalbán & Blasco, 2018). This is similar to what García Valencia et al., (2011) reported as differences between the urban and the rural population, in which the rural population used poison as the preferred method of death more often than the urban population, who resorted more frequently to firearm use. Complimentary to Cano-Montalbán & Blasco's systematic review, a Finnish study observed that persons choosing to die by intoxication were most often females who had a history of suicide attempts and mental health issues. The same study found that persons choosing to die by carbon monoxide poisoning were most often younger males who intoxicated themselves before completing suicide and who experienced a recent interpersonal loss (Pirkola, Isometsä & Lönnqvist, 2003).

Some demographic variables may have specific effect over the use of one method of suicide or another. In a systematic review of drowning cases over a twenty-year period, Wirthwein, Barnard and Prahlow (2002) noted that geography may be related to this method of suicide as it was less frequent in non-coastal areas. It may also be that this is a question of availability. Such findings were confirmed by Paraschakis et al., (2017). Considering drowning, age and gender have been indicated as significant factors in preferring this method of suicide. There seems to be a greater tendency for males to opt for this method (Auer, 1990; Byard et al., 2001) even though this may be affected by socio cultural factors (Byard & Lipsett, 1999). The method seems to be preferred by older adults as various studies have found (Lester, 1989; Byard et al., 2001). It was also noted that females tend to drown themselves at sea or in a bath whilst males tend to choose freshwater locations like rivers and lakes. (Byard et al., 2001)

Various studies have examined trends in the choice of suicide methods. Most of these indicated that the choice of method of death, if ever there is a choice in suicide, is driven by the availability of the method when considering the physical ability and cognitive capability to pursue it and by the level of social acceptability, or rather the perception of acceptability of the same method. These are variables that change over time and hence the change in trends of suicide methods. Processes like the impact of urbanisation on accessibility and in providing opportunities, coupled with an increase in media-provided information about methods of suicide has changed the way people perceive

different methods of suicide. There may be some distinguishable characteristics between persons opting for different methods of suicide and the study of such characteristics will, in the near future, be important in prevention and intervention. A sure challenge will be to prevent suicide by hanging as the method, whilst difficult to control, is fast becoming socially acceptable (Samaritans, 2019).

Location of Death

The location of death as an issue of influence in suicide has not been adequately addressed in suicide research. The place of suicide may influence the method of suicide and vice-versa but there could also be various other reasons why a person opts to suicide in one place and not the other. Understanding any noticeable patterns in the place of suicide could be of importance for prevention efforts (Kposowa & McElvain, 2006).

It is evident, not only in death by suicide, that most people prefer to die in a place which they know as opposed to other places (Munday, Dale & Murray, 2007). If one had to randomly ask a group of people where they would prefer to die, the majority would choose their home (Drought & Koenig, 2002). In line with these findings, research has indicated that, with some exceptions, most suicides, in countries across the globe, occur at home. In a study across eight countries conducted by Rhee et al., (2016), it was reported that in seven of the eight countries examined, more than 50% of suicides occurred in the home or a familiar setting. This tendency was stronger when the method of death was hanging and poisoning. Other studies have associated home suicides with the method of death and the accessibility at home of tools required to die by that particular method of suicide (Wiebe, 2003; Rhee et al., 2016). In Kposowa & McElvain (2006) the same association was observed for suicides at home and firearms. It was observed that, as other studies have found, the rate of home suicides by firearms was higher in areas where firearm ownership is higher and that Americans discharged more firearms at home to die by suicide rather that protecting their home from crime (Miller, Azrael & Hemenway, 2002).

The home is also a preferred place of suicide due to the privacy it offers. Lester (2015) suggested that people tend to kill themselves alone to minimise the chance of being overlooked and to avoid interference by possible bystanders. This may indicate greater determination in people choosing to suicide at home when compared to others dying in a public place although it could also be due to the fact that the home facilitates suicide by hanging and the use of firearm when compared to the outdoors (Kposowa & McElvain, 2006). Other studies have even noted gender differences in suicides at home: men were more commonly found in a shed or a garage and women in their bedroom (Taylor, 2010). There may be issues of privacy even within the home. Dogan, Demirci and Deniz (2015) examined cases of suicide by hanging from a tree. In ten cases, suicide happened in the garden at home *(n=9)* or in a familiar setting, *(n=1)*. The remaining ten cases occurred in remote locations including seven in isolated woodlands. All ten suicides which occurred in the home or familiar setting happened at night whilst those in remote locations happened in daytime. The choice indicates that even though a person would opt to die at home, measures to assure others do not interfere are still undertaken by dying at night when others in the same home are not around. This was not evident in those dying in a remote location as the location itself rendered that protection (Dogan, Demirci and Deniz, 2015).

Suicide in public areas does not necessarily mean a public manifestation of death. On the contrary, most of these deaths occur in desolate locations such as already seen, in woodlands, at riverbanks, on remote beaches and in areas with difficult access to the general public (Taylor 2010). Most of the suicides in public occur in rural settings which can thus have a bearing on the method of suicide employed. Jumping from heights, for example, even though not uncommon to occur in homes, happen more frequently in locations with coastal cliffs. This is also true of does drowning (Owens, Lloyd-Tomlins, Emmens & Aitken, 2009). There could possibly be differences in the psychological and cognitive make up of persons who use the same method of suicide but conduct it in different locations due to the features offered by the locations. Literature has, however, not been forthcoming in showing any possible differences (Kposowa & Mc Elvain, 2006).

The impact the location of suicide may have on other persons than the deceased, has been calculated by the psychological distress families and acquaintances of the deceased have reported. Most often, suicides at home have an effect on the immediate family and friends of the deceased particularly those who would find the body or see the body. Being at home, however, may produce a different psychological reaction than finding a suicide of a loved one out of home where one feels less protected. (Spillane et al., 2017). It may also have a different effect on investigators in establishing if the death is a suicide.

The impact of suicide in a public location can also have adverse psychological effects on people unrelated to the deceased. Bystanders and other persons who witness a dead body may suffer long-lasting psychological trauma. Some suicides directly involve other persons such as truck or train drivers with understandably heavier consequences (Tranah & Farmer, 1994). Any death in a public location may attract media attention and many times the media is insensitive to ascertain if the case is a homicide, a suicide or a sudden death. Research has indicated that such coverage in case of suicide may do more harm than good. Media reporting can encourage further suicides with obvious negative effects (Pirkis et al., 2007).

The choice of location for suicide may have a symbolic aspect attached to it; some do it by choosing a location to convey a message to someone; others travel long distance to a place considered mystical for suicide like the Golden Gate Bridge in San Francisco (Seiden, & Spence, 1983). There may be various reasons why a particular location is chosen. Some may choose a secluded location in their pursuit for tranquillity and solitude; others want to be one with nature whilst others desire not to be found by family and friends to spare them the distress of finding them dead (Owens et al., 2009).

Location is possibly an overseen variable in suicide studies. It has lately been marginally incorporated in suicide prevention studies particularly in restricting the access to places known for suicides. There is, however, the potential to extract further information regarding the location or place of suicide as it may be intrinsically bound to other choices like the method of death. There is a need to understand this relationship

especially in the light of other variables like time of death, gender, rurality and urbanisation.

Day and Time of Death

It is of no coincidence that the figures highlighted in Dogan et al., (2015) show a pre-emptive measure to avoid contact with others by choosing the time of death. The choice of the exact day and time to die by suicide may be affected by various factors amongst which would be opportunity (Taylor, 2010).

A number of studies have, however, shown that there are cyclical changes in the frequency of suicide. Some studies indicate seasonality, typically with an increase of suicides in spring and early summer (Ajdacic-Gross et al., 2010) or at the beginning of every season (Rocchi & Perlini, 2002). It has been noted, however, that this varies across regions. Preti (1998) claims that environmental factors such as the climate could be affecting seasonal variations. The seasonal phenomenon has also been explained through biological factors like the cyclical nature of melatonin and serotonin and their effect on sleep, mood and depression (Dereli et al., 2018).

Studies conducted to examine if there are differences between each day of the week found that most suicides happened on Monday (Bradvik & Berglund, 2003; Zonda, Bozsonyi, Veres, Lester & Frank, 2009). The same studies indicated that suicides were less frequent during the weekend.

Compared to these studies, less attention has been given to diurnal changes and any association these changes might have with suicide. Boo, Matsubayashi and Ueda (2019) list nine such studies which more or less are limited, either because of an inadequate sample or because of the restricted time-span of such studies. The large-scale dataset in Boo et al. (2019), examined 41 years of data from Japan. Apart from confirming the results from the other studies that most suicides happen on Monday, it was noted that there are age differences in the time of day used to die by suicide. This has, however, been coupled with economic prosperity; middle aged men were more frequently noted

to die by suicide early in the morning after prosperous periods were over and when the unemployment rate rose. No such difference was noted in females and retired men. Moreover, both categories showed an inclination to die by suicide during the day rather than at night (Boo, Matsubayashi & Ueda, 2019). These findings suggest that different sections of the population may be responding differently to various stressors, manifesting itself as difference in the time of day when suicide occurs.

Conclusion

Suicide is as complex as human nature and is affected by various variables. Some of these increase the risk of suicide and some of them have a protective value. Not all risk and protective factors affect human beings in the same way. Whilst some risk factors have been universally noted, others are still being studied. The review of how each variable interacts with others is an active and ongoing process. Some variables have a stronger effect on the person than others as different clinical features interact differently with variables like mental illness, gender and other demoraphic variables. Some variables like the value of the family can offer a protective value which is greater than the potential risk they pose by their absence. Suicide has been described as a multidimensional malaise as there is no one single variable that precipitates suicide but rather an alignement of deficiencies or risks that would, together, create the right environement for suicide to happen. There are many choices a person makes in suicide. These may be a reflection of the various risk factors and may in themselves increase risk. Complex as it may seem, increased knowledge of risk and protective factors and their interaction with other environmental factors is important in our journey of prevention of suicide.

Chapter 4 – The Present Study

Introduction

No other theme regarding death has recently attracted as much research as suicide. This has resulted in a vast body of literature, and is reflected in a growing interest in suicide from new fields of study like bio-medical research and artificial intelligence (Hawton & Heeringen, 2000, Kennedy & Fonseka, 2018). Suicide research has developed rapidly, and the focus has changed from risk factors and risk analysis to a more comprehensive focus on the relationship between risk factors and significant life events (Emergency Nursing Resources Development Committee, 2012). More so, the 'ideation to action' models have also gained particular and practical attention (Nock, 2017), as has the idea of having local research.

In the globalised world we live in today, anything has become international. We are many times thinking only on "global lines" or at a "global level", discarding local knowledge which is essential for many decision-making processes. One of the fields where local solutions are more efficient than global answers is suicide. Suicide is as collective as it is personal, and is affected by culture, ethnicity and race amongst others (Goldston, Davis Molock, Whitbeck, Murakami, Zayas & Nagayama Hall, 2008). The research, however, remains fragmented (Mental Health Commission of Canada, 2018). This research fills a gap in knowledge, particularly local knowledge, in Malta.

Local Knowledge vs Global Knowledge

Knowledge today seems to be internationalised due to the ease with which it travels around the globe. There are, however, frequent calls to obtain local knowledge and appreciate local scientific achievements, not to challenge the "world picture" but to appreciate that local knowledge enriches global knowledge by making it relevant at the minutest of levels within our communities (Sillitoe, 2007). This is surely relevant in suicidology. Local and indigenous knowledge is more likely to facilitate more specific

and successful prevention strategies and intervention plans in a timely, efficient manner. The strength of global and local knowledge is in their dynamics; whereas global knowledge has the wide perspective of different countries, cultures, religions and many more facets, local knowledge has the imperative importance of carrying what really affects the particular community.

When studying risk factors of suicide, much of our knowledge came from American and European research, which seems to dominate not only this field of study but many others. Local knowledge and data, which many times bolster what was found in Europe and America, may be more specific to particular communities and - as such - facilitate more successful interventions (Sillitoe, 2007).

When we speak of local knowledge, many think that it is about concepts or beliefs that are generated, collected, applied and conveyed to others without science or system. This is not what this study refers to. Empirical methods are employed because of the belief that for local knowledge to be effective, it should have the highest of standards enjoyed by global knowledge.

This notion of global vs local does not only hold for data and statistics about suicide, but also in the investigative field. For local suicide investigations to be effective, the police need to be imbued with the global knowledge on the subject but conversant with the local specifics.

The Research Question

This research was inspired by the need recognised by those working in the mental health support fields, police officers and other professionals in Malta, for a better understanding of suicide and related issues in theMaltese context.

"What is the nature of suicide in Malta and what are the best ways in which the police in Malta can contribute to its prevention?"

It may be a question stemming out of the lack of information and knowledge about what the local situation is but it is surely a question being asked by many in a search to prevent further loss of precious lives. To date, Malta still lacks a comprehensive suicide prevention programme or strategy, even though many stakeholders have been highlighting its importance and immediate necessity. The logical start for any such programme is taking stock of the current situation, so as to know who is at risk and why, and then plan ahead accordingly.

This study should therefore serve as the first step towards an understanding of suicide in Malta by collating the crude facts already collected by the police in their course of duty and presenting them in a scientific manner. On top of that, it should also serve the police to better understand the work undertaken during their investigations and set a higher standard to be the leading agency in providing much needed data and insights into suicide within the Maltese islands.

Only two studies have explored suicide in Malta: the first study conducted in 1974 by Meilak, Cassar and Grech examined deaths by suicide recorded in Malta between 1955 and 1972 using data from Magisterial Inquiries; the second study by Helema, Halopainen and Partonen, conducted in 2009, examined suicide rates of the Maltese islands between 1955 and 2009 but did not delve into the dynamics of suicide per se, as the scope of the study was to compare suicide rates within Europe. Even though the first study is an actual snapshot of suicide in Malta, its relevance after more than 40 years is questionable. The second study is relevant in comparing statistics with other European nations, but lacks in epidemiological value.

As for the second part of the question, that is, in what ways can the police best contribute to the prevention of suicide; the gaps in knowledge and literature are even greater. This is the first time such a study on the operational aspects of policing in suicide investigations in Malta has been undertaken.

The Malta Police Force is the only law enforcement agency entrusted to investigate *all* cases of death where an investigation is warranted. It is therefore an agency that has the

capacity to have sound first-hand information on *all* the reported deaths by suicide. The Malta Police Force is thus in an exceptional position to provide the nation with sound statistics, data and knowledge on suicide - more so than any other agency. It can therefore be acknowledged that the greatest contribution the police in Malta can provide to the field of suicide studies is the effective collection of data. This is in line with the raison d'être of the Force in its preventive capacity and in protecting life.

The Aims and Objectives of this Research

This project has three aims and a number of associated objectives, as described below:

i. *Collect and analyse all relevant data on suicide in the Maltese islands for a period of 15 years between 2003 and 2017, in order to determine the nature and characteristics of suicide in the Maltese islands;*

To achieve this aim, four objectives were set:

- Determine demographic variations in suicide in Malta

  Demographic markers have been cited in literature as strong predictors of risk or protection for suicide. Many studies have found ample evidence that some demographic variables are directly linked to the various stages of suicide, from ideation to attempt or completion. Others have found a weak or a non-significant relationship with suicide and between variables themselves. Determining the existence of these relationships, their strength, and their utility as predictors of suicide, is crucial in the quest to have an accurate portrayal of the nature and characteristics of suicide in the Maltese islands.

- Examine the history of suicide and mental illness of persons who die by suicide in Malta

A history of mental illness, suicide by family members and friends, and a previous suicide attempt have collectively been identified as some the strongest predictors of suicide. Mental illness has been associated with higher levels of self-harm and suicide. Independently, various mental illnesses have been found to be associated with different forms of suicidal behaviour and with completing suicide in general. Different groups show different reactions and responses to mental illness. A previous suicide attempt has been identified as a very strong predictor of suicide, since a good percentage of those who attempt suicide and fail are then likely to re-attempt and die by suicide. Observing how the Maltese are affected by mental health issues, by attempts and by the attempts of family members or friends, and how these factors are related to suicide is therefore of paramount importance.

- Explore which significant life events have an effect on suicide in Malta

  Stressful and life-threatening events have been directly linked to suicide. These significant life events, varying from child abuse to separation or divorce or the death of a significant other, all leave a traumatic imprint on the affected person. Some do not cope well and ideate about suicide; others are impulsive and die by suicide. Such life-events can have a long-term effect on the person or can happen immediately prior to death. The knowledge of which life events have greater effect on the persons completing suicide in Malta would be beneficial not only for developing a profile of suicide in Malta, but also for preventive measures.

- Explore suicidal behaviour and ideation manifested by persons who die by suicide in Malta

  Suicide ideation and behaviour precedes the attempt or completion of suicide and, as such, any knowledge about these actions can have predictive potential. Knowledge of suicidal behaviour and actions, possibly particular to the Maltese islands, has a multi-fold importance. Different behaviours may manifest at different stages in the process from suicide ideation to suicidal behaviour and

actions; therefore, knowledge of such behaviour may be beneficial for suicidal assessment and in emergencies. This is also important in mapping local trends of suicide and how these change over time. Their predictive and diagnostic value is an important facet in knowing the true nature and characteristics of suicide in Malta

ii. *Explore the completeness and accuracy of data recording to better understand the formulation of the investigation process of suicides in Malta;*

To achieve this aim, two objectives were set:

- Explore the frequencies with which the police gathered the information in the four categories of data identified ie: demographics, history of suicide and mental illness, suicidal behaviour and ideation, and significant life events

  Some of the variables identified in the literature and classified as four broad categories and manifested as four objectives in the previous aim of this study are more universally known. For example, mental health issues are associated with suicide in the mind of the general public and the police alike, more than the level of education is. One would naturally expect that these would be better annotated by the police than other variables which are not commonly associated with suicide. Knowing in which of the categories the police may be deficient in collecting and processing information will assist in understanding how suicide investigations are conducted by the police in Malta and - more importantly - in projecting how the investigation process could be ameliorated and prioritise what resources need to be allocated.

- Identify patterns and variations in how the police collected data within the four categories of data identified

  Building on the frequencies with which the police gather information in each of the four classifications of data, the objective would be widened to explore and

identify if there are reasons why the police gather that particular data and not other data. This could be done by identifying patterns and variations which may point towards operating procedures (or the lack of them), particular ways of conducting investigations, or any burdens on the whole system that are affecting the investigative process of the police. The identification of patterns and variations in how the police are gathering data may also serve as a basis for development, especially in the standardisation of the investigative process.

iii. Develop a robust standard data collection tool for use by the police in their investigation of deaths by suicide;

To achieve this aim, two objectives were set:

- Identify which data acknowledged as important in the suicide literature is currently not collected sufficiently or correctly by the police

  In preparation for the finalisation of a standard data collection tool, the identification of what data the police are recording, and which they therefore deem important, and what data about suicide is either discarded or not deemed important enough to be reported, is necessary. This would provide a comprehensive picture of what data is required to develop the standard data collection tool.

- Based on what was determined as important data to be collected by the police, develop and propose a standard data-collection tool.

  A standard data collection form would ensure that all data that is important for police investigations, as well as for defining the nature and characteristics of suicide in Malta more generally, is collected. It would provide a structured approach to data collection in an efficient and less time-consuming manner. It would not only enhance the investigative skills of the police, but also provide the basis for reliable and consistent reporting on every investigation. While most of the data are straightforward and objective, some of the data to be collected are subjective in nature. These particularly relate to 'ideation to action' factors of

suicide. The tool would include a standard parametric definition of each variable, without which conceptual clarity problems may arise. Finally, a standard data collection tool would render the data better for comparability purposes.

Conclusion

The aims and objectives of this research follow each other in primarily collecting data on death by suicide in Malta in order to determine the nature and characteristics of suicide in the Maltese islands. It is a snapshot of a fifteen-year period, which may reflect changes in Maltese society throughout the early new millennium. This is followed by a stock-taking exercise of the investigative process undertaken by the police in Malta in their investigation of suicide, and the proposal of an investigative support tool for the police which should result in higher standards of data collection by the police.

Chapter 5 - Methodology

Overview

The previous chapters have identified the theoretical and idiographic features of suicide and set the backdrop for the present study. This chapter gives an outline of how this research was conducted. It provides basic information on the Maltese islands for readers to familiarise themselves with the administrative aspects of the island state. It is followed by a content analysis of literature through which risk factors and precursors of suicide were identified. This list should not be taken as an exhaustive list but rather as indicative of the most universally reported factors. The outcome of the content analysis served as the basis of the Investigative Support Tool which will be described further on.

Design

This study employs a quantitative research approach as this method emphasises the objective measurement of data and the computational method of statistical analysis. Such approach allows for the quantification of data in a standard output even though it may have been collected using different methods, which in turn allows for the same data to be analysed qualitatively at a later stage. A quantitative approach also allows for the measurement of the incidence of variables, establishes associations between these variables, and allows for their conversion into statistical forms like tabulations which are mostly descriptive but which produce conclusive findings. As one of the main aims of this study is to develop an understanding of the current situation regarding suicide in Malta, a descriptive quantitative approach was deemed a suited tool to reach such an aim.

A quantitative approach is usually characterised by the use of structured research instruments coupled with the use of larger samples which represent the various characteristics of a population. In this regard, this study employed a structured standard data collection procedure in the use of the Investigative Support Tool. All suicides recorded within a fifteen-year period. These measures allowed the study to be

more objectively structured yet flexible enough to be replicated, whilst increasing its reliability. A quantitative approach was also considered to be more beneficial in generalising concepts more widely and predicting future results more reliably.

The major aim of this study was to collect data on suicide and the investigation process of suicide in Malta in order to develop a standard data collection tool which can facilitate such investigations. The basis of such study has therefore been tied to capturing observable behaviours and risk factors previously identified in the literature. This made the study more observational in nature. Variables were recorded in their raw state, without experimental manipulation or control, and their correlation studied as a way to determine the relationships between them and not to speculate about their causality.

The data examined in this research is historical data collected by the police in their investigations of suicide between 2003 and 2017. Descriptive data regarding risk factors and variables was collected for the entire cohort of persons who died by suicide in the same period. It is therefore a representation of expository knowledge required in a retrospective observational study which aims to define characteristics, measure data trends and conduct comparisons which could also serve as the basis for future *prospective studies* on the subject (Patton, 1990).

The usefulness of conducting a retrospective observational study such as this one is that, through such design, the risk factors and salient behaviours can be detected and measured unobtrusively and without the ethical concerns which other designs like randomised controlled experiments can pose (Rosenbaum, 2009). Such designs also offer greater reliability as to degree to which results can be generalised to the larger population (Patton, 1990). In this study this is strengthened by the fact that the sample is the whole cohort of persons of who died by suicide in the period under review. An observational design also enables this study to be useful in the formulation of hypotheses which might be tested in prospective studies, providing much needed macro-level data which could prove valuable in informing future suicide prevention

programs (Nahin, 2012). Much like in medical research, an observational study design is also more likely to provide information of a practical nature (von Elm et al., 2007); this is particularly valuable when examining the practical nature of suicide investigations conducted by the police. The design of this study therefore binds research requirements with the aims and objectives of the research.

Considering this approach, a quantitative-based cross-sectional design was deemed most appropriate for this study. The advantage of such a design is the capacity to make statistical inferences about the cohort under review and to study and compare possible subgroups within the cohort. This approach was deemed better for the purpose of this study than a qualitative approach, which focus largely on the interpretation of descriptive accounts of involved persons which in any way, for obvious reasons, would not have been viables for this study.

A quantitative cross-sectional design is usually characterised by the use of structured research instruments, coupled with the use of larger samples which represent the various characteristics of a population. In this regard, this study employed a structured standard data collection procedure through the use of the Investigative Support Tool by utilising a sample consisting of all recorded suicides within a fifteen-year period.

As this is an observational study with a quantitative cross-sectional design, the STROBE (Strengthening the reporting of observational studies in epidemiology) guidelines (von Elm et al., 2007) were followed. The STROBE Checklist was used to ascertain the required quality of reporting. (A copy of the checklist is provided as Appendix 4.)

Analytical Strategy

When considering the aims and objectives of this study together with the quantitative data collected from police sources, the best research option was to use such data inferentially, that is, to make probability predictions where possible. This study makes extensive use of cross tabulations as a form of statistical measurement. Such an

implement allows for the investigation of causal relationships between variables and measures how these variables interact and relate to one another. Where cross tabulations were used to examine data within sub groups, this enabled the examination of relationships that might not be apparent when analysing aggregate totals thus providing a means of examining micro-interactions. Multinomial logistical regression was also employed in the evaluation of methods of death and the location of suicide. As data is case-specific, each independent variable has a single value in each case which makes multinomial regression ideal in the prediction of a relationship between various independent variables.

Other statistical methods were contemplated in the evaluation of the collected data. Multidimensional scaling was considered as a means of evaluating the the strength of interactions between the measured variables. However, due to low frequency on many variables, multi-dimensional scaling returned ackward plots which could not be reliably interpreted, and did not translate pairwise distances into a configurable map to be utilised within this study. Chi-square automatic interaction detection (CHAID) was also considered due to its advantage of using non-parametric analysis and for its highly visual benefit. However, considering the small number of cases within most categories and the low frequencies of many variables, as was the case with multidimensional scaling, it returned inappropriate 'trees' which could not be successfully utilised.

Population and Sample – The Maltese Islands.

Malta is made up of several islands, three of which are inhabited. The country had a population of 475,701 at the end of 2017 (NSO, 2019). This signifies an increase of 75,834 persons when compared to the 399,867 persons registered in 2003 (NSO, 2003). In 2017, the largest island, Malta, had a population of 442,978 whilst Gozo and Comino had 32,723 registered inhabitants (NSO, 2019). The total population figures include both Maltese nationals and foreigners holding a residency permit.

For the purpose of statistical comparability, the European Union has proposed and created a standard hierarchical classification called the Nomenclature of Territorial

Units for Statistics (NUTS) for national and regional statistics and the Local Administrative Units (LAU) for statistics at a local level. Malta is divided into two regions for the purpose of NUTS namely the region of Malta and the region of Gozo and Comino. Malta is further divided into six districts at LAU Level 1 and into sixty-eight localities in LAU Level 2 of which fifty-four localities are within the region of Malta and fourteen are within the region of Gozo and Comino. This is illustrated in Map 1.

Map 1.

Graphical illustration of Malta by NUTS Classification (Region of Malta and Region of Gozo and Comino)

Note: Adapted from *Regional Statistics Malta, 2019 Edition*, National Statistics Office (NSO), Valletta, Malta, 2019 p.4

Table 1.

Local Administrative Unit Level (LAU1 and LAU 2) Classification for Malta

LAU 1	LAU 2
Southern Harbour	Cospicua (Bormla); Il-Fgura; Il-Furjana (Floriana); Ħal Luqa; Ħaż-Żabbar; Il-Kalkara; Il-Marsa; Paola (Raħal Ġdid); Senglea (L-Isla); Hal Tarxien; Valletta; Vittoriosa (Il-Birgu); Ix-Xgħajra.
Northern Harbour	Birkirkara; Il-Gżira; Ħal Qormi; Il-Ħamrun; L-Imsida; Pembroke; San Ġwann; Santa Venera; San Giljan; Is-Swieqi; Ta' Xbiex; Tal-Pietà; Tas-Sliema.
South Eastern	Birżebbuġa; Il-Gudja; Ħal Għaxaq; Ħal Kirkop; Ħal Safi; Marsaskala (Wied il-Ghajn); Marsaxlokk; L-Mqabba; Il-Qrendi; Iz-Żejtun; Iz-Żurrieq.
Western	Ħad-Dingli; Ħal Balzan; Ħal Lija; Ħ'Attard; Ħaż-Żebbuġ; L-Iklin; Mdina; L-Mtarfa; Ir-Rabat; Is-Siġġiewi.
Northern	Ħal Għargħur; Il-Mellieħa; L-Imġarr; Il-Mosta; In-Naxxar; San Pawl il-Bahar.
Gozo and Comino	Il-Fontana; Għajnsielem; L-Għarb; L-Għasri; Il-Munxar; In-Nadur; Il-Qala; San Lawrenz; Ta' Kerċem; Ta' Sannat; Victoria (Rabat); Ix-Xagħra; Ix-Xewkija; Iz-Żebbuġ.

Note: Adapted from *Regional Statistics Malta, 2019 Edition*, National Statistics Office (NSO), Valletta, Malta, 2019 p.5

The population of Malta between 2003 and 2017 according to LAU 1 classification, that is by district, is illustrated in Table 2.

Table 2.

Population of Malta by LAU 1 classification between 2003 and 2017

Year	Southern Harbour	Northern Harbour	South Eastern	Western	Northern	Malta *(Region)*	Gozo & Comino	Total
2003	85629	122913	55199	55114	49395	368250	31617	399867
2004	85749	123673	55695	55419	50168	370704	31964	402668
2005	81050	119355	59373	57041	57173	373992	31007	404999
2006	80499	119073	59990	57021	58070	374053	30963	405616
2007	80252	119278	60837	57229	59194	376796	31036	407832
2008	80193	119732	61819	57559	60445	379748	31178	410926
2009	80119	120197	62799	57887	61703	382705	31322	414027
2010	79635	120036	63453	57919	62642	383685	31304	414989
2011	79474	120343	64349	58613	63814	386143	31403	417546
2012	79487	122954	65351	58524	64771	391087	31422	422509
2013	79472	126980	66473	58836	66207	397968	31456	429424
2014	79833	133052	67418	59158	68497	407958	31733	439691
2015	80273	138687	68442	59683	71405	418490	31925	450415
2016	80664	143773	69187	60131	74336	428091	32206	460297
2017	81582	151664	70490	60692	78550	442978	32723	475701
Mean	80927	126781	63392	58055	63091	392177	31551	423767

Note: Adapted from *Demographic Review 2005 – 2012 Post Census Revsions*, National Statistics Office (NSO), Valletta, Malta, 2015 p.11 and *Regional Statistics Malta, 2019 Edition*, National Statistics Office (NSO), Valletta, Malta, 2019 p.5

Map 2.

Graphical illustration of Malta by LAU Level 2 Classification

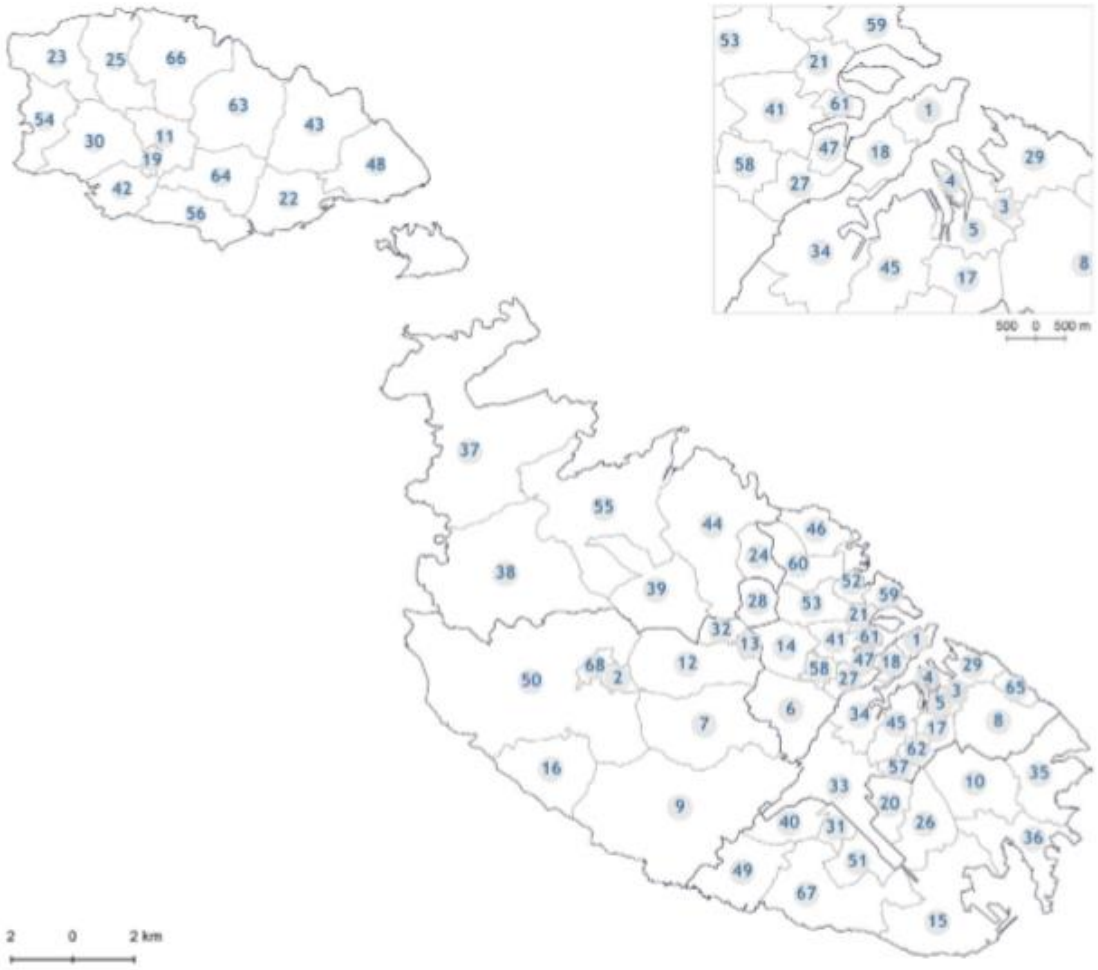

Table 3.

Localities assigned by district for Malta and Gozo (LAU1 and LAU 2)

Key	Locality (LAU 2)	District (LAU 1)	Key	Locality (LAU 2)	District (LAU 1)
1	Valletta	Southern Harbour	35	Marsaskala	South Eastern
2	Mdina	Western	36	Marsaxlokk	South Eastern
3	Vittoriosa	Southern Harbour	37	Il-Mellieħa	Northern
4	Senglea	Southern Harbour	38	L-Imġarr	Northern
5	Cospicua	Southern Harbour	39	Il-Mosta	Northern
6	Hal Qormi	Northern Harbour	40	L-Imqabba	South Eastern
7	Haż-Żebbuġ	Western	41	L-Imsida	Northern Harbour
8	Haż-Żabbar	Southern Harbour	42	Il-Munxar	Gozo
9	Is-Siġġiewi	Western	43	In-Nadur	Gozo
10	Iż-Żejtun	South Eastern	44	In-Naxxar	Northern
11	Victoria	Gozo	45	Paola	Southern Harbour
12	H'Attard	Western	46	Pembroke	Northern Harbour
13	Hal Balzan	Western	47	Tal-Pietà	Northern Harbour
14	Birkirkara	Northern Harbour	48	Il-Qala	Gozo
15	Birżebbuġa	South Eastern	49	Il-Qrendi	South Eastern
16	Had-Dingli	Western	50	Ir-Rabat	Western
17	Il-Fgura	Southern Harbour	51	Hal Safi	South Eastern
18	Il-Furjana	Southern Harbour	52	San Ġiljan	Northern Harbour
19	Il-Fontana	Gozo	53	San Ġwann	Northern Harbour
20	Il-Gudja	South Eastern	54	San Lawrenz	Gozo
21	Il-Gżira	Northern Harbour	55	San Pawl il-Bahar	Northern
22	Għajnsielem	Gozo	56	Ta' Sannat	Gozo
23	L-Għarb	Gozo	57	Santa Luċija	Southern Harbour
24	Hal Għargħur	Northern	58	Santa Venera	Northern Harbour
25	L-Għasri	Gozo	59	Tas-Sliema	Northern Harbour
26	Hal Għaxaq	South Eastern	60	Is-Swieqi	Northern Harbour
27	Il-Ħamrun	Northern Harbour	61	Ta' Xbiex	Northern Harbour
28	L-Iklin	Western	62	Hal Tarxien	Southern Harbour
29	Il-Kalkara	Southern Harbour	63	Ix-Xagħra	Gozo
30	Ta' Kerċem	Gozo	64	Ix-Xewkija	Gozo
31	Hal Kirkop	South Eastern	65	Ix-Xgħajra	Southern Harbour
32	Hal Lija	Western	66	Iż-Żebbuġ	Gozo
33	Hal Luqa	Southern Harbour	67	Iż-Żurrieq	South Eastern
34	Il-Marsa	Southern Harbour	68	L-Imtarfa	Western

Content Analysis

For the purpose of this examination, a content analysis of the available literature was conducted. The literature content included 92 articles and chapters from books about various risk factors of suicide, precursors of suicide, affective and preventive factors of suicide and related matters. The complete list of academic literature included in this content analysis is found in Appendix 1.

Through this literature analysis, 46 variables were identified and earmarked as being important in plotting a profile of each of the persons who died by suicide in the period under review. These variables can be loosely classified into four categories: (D) demographics, (H) history of suicide and mental illness, (SB) suicidal behaviour and ideation, and (LE) significant life events.

Each of the identified 46 variables are defined, classified and described below:

Variable	Category	Description
Variable 1	D	**Date of Birth and Age** The chronological age at time of death.
Variable 2	D	**Gender** Biological sex: male or female.
Variable 3	D	**Sexual Orientation** Sexual identity including heterosexual, homosexual (lesbian and gay), bi-sexual, transsexual, intersex or queer.

Variable 4	D	**Race** Physical and cultural characteristics based on family history, skin colour and place of origin.
Variable 5	D	**Nationality** The official status of belonging to a nation.
Variable 6	D	**Immigration Status** Whether indigenous, naturalised or having permission to be in the country.
Variable 7	D	**Marital Status** The relationship to a significant other, whether official or informal.
Variable 8	D	**Residence** The place of residence at time of death.
Variable 9	D	**Religion** Religious affiliation.
Variable 10	D	**Parents**

		Mother and father of the deceased and frequency of contact.
Variable 11	D	**Siblings** Brothers and sisters and frequency of contact with each other.
Variable 12	D	**Children** Offsprings and the frequency of contact.
Variable 13	D	**Extended Family** Other family members beyond the nuclear family including grand- parents and cousins and other close relatives.
Variable 14	D	**Friends** Persons with whom there is a special bond exclusive of family.
Variable 15	D	**Social affiliations** Participation in local or national organisations, associations, clubs, groups and others.
Variable 16	D	**Vices**

Participant in socially repulsive behaviour including smoking, drinking, gambling and the use illegal substances.

Variable 17 D **Date of death**

The calendar date of death. Where this could not be established with certainty, the date of death established by the coroner and confirmed in the Certificate of Death and cause thereof was used.

Variable 18 D **Time of death**

The time of death by suicide or the approximate time of suicide established through investigations.

Variable 19 D **Place of death**

The locality in Malta where the death occurred. The standard used by the National Statistics Office was adopted that is the Nomenclature of Territorial Units for Statistics (NUTS) for national and regional statistics and the Local Administrative Units (LAU) for local statistics.

Variable 20 D **Type of place of death**

Eight particular classifications of places where suicides occurred and a generic class were identified;

i. Home: place of abode.
ii. Private Garage: a place for housing motor vehicles whether connected to a home or separate.

iii. Public Area: a region or part of town accessible to the general public including streets, open spaces, fields, seaside areas and others.
iv. Bastions: the outer parts of fortifications mostly made of high walls. Malta has more than 60 kilometres of such fortified walls.
v. Cliffs: steep natural rock faces, some of which face the sea.
vi. Bridge: a structure carrying a road over a gorge or valley. The highest bridge in Malta, over Wied il-Ghasel in Mosta was the only one used in suicides.
vii. Institution: a place established by law to offer a particular service These included police holding cells, prisons, hospitals, respite homes and homes for the elderly.
viii. Others: a generic classification of places where a suicide occurred and which could not be classified in the other categories including government buildings other than institutions, hotels, holiday homes, stores, warehouses and private construction sites.

Variable 21 D **Method of Death**

The procedure by which the death by suicide occurred. Seven methods were identified as being more commonly used than others:

i. Hanging: suspending the body over a fixed point by ligature or noose around the neck.
ii. Jumping off heights: taking a leap from a high ground onto a dangerously lower ground.

iii. Use of firearms: using a rifle, pistol or another gun to shoot oneself dead.

iv. Substance use: ingesting drugs or other chemical substances, whether legal, prescribed or illicit in a dose that is higher than recommended or higher than the body can process.

v. Carbon Monoxide poisoning: the intentional inhalation of Carbon Monoxide through being enclosed within a vehicle or place in which carbon-based fuels are partially burnt.

vi. Drowning: the deliberate submersion of oneself in water without any means to inhaling or exhaling air.

vii. Self-Stabbing: death by thrusting a knife or another sharp object into essential or critical areas of the body including the torso (containing vital organs) and main arteries in neck, hands and feet).

viii. Others: a generic classification of methods of death which could not be classified into one of the described methods.

Variable 22 SB **Planning vs Impulsivity**

Planning

i. ii. Signs that the deceased was in the process of making, plotting, designing or executing a strategy to die by suicide. These could either be direct signs or circumstantial evidence.

iii. Direct signs comprise any development of ideas and actions on the method of death, on the place of death, on the timing of the commencement of suicide and how significant others may find the body. Some actions may be overt particularly those associated with the method of death like preparing a specific noose to hang from. Other actions may be less conspicuous particularly those associated with intent like distractive behaviour intended to mask the suicidal behaviour.

iv. Circumstantial evidence consists of indirect evidence of the deceased's own preparation for death. These include but are not limited to actions undertaken by the deceased just days before his or her demise. These may include updating a will, making financial arrangement for the distribution of his or her own estate and giving things away as if leaving the islands.

v. An elaborate suicide note and letters or written messages which have been written some days prior to the suicide considered as signs of preparation for death.

Impulsivity

i. ii. Signs that the deceased acted to die by suicide out of "whim" or out of a sudden desire to die without

overt signs that he or she ever had a plan to die by suicide.

iii. Indications that the deceased actually had plans for different activities other than suicide like setting up meetings on the day of death or for the days after, setting up a men's night together with friends and colleagues and other planned activities which seems to suggest that the deceased had planned a "normal" routine and not actions to terminate one's own life.

iv. A suicide note that seems to be hastily prepared or made on what was available like a napkin, a mirror or a roughly cut piece of paper taken from the same place where the note was found. These types of suicide notes were taken as a sign of impulsivity.

Variable 23 SB **On suicide**

SB ***Self – Harm***

Intentional physical injury on oneself with or without the intent of suicide including self-mutilation or cutting, self-burning and skin peeling.

SB ***Suicide Ideation***

Thinking about suicide or of attempting suicide, considering to terminate one's own life and other

associated ideas centred around procuring one's own death.

SB ***Desire to attempt***

A progression on the idea of suicide into having an aspiration to overcome the fear of death and sustaining a convinced and motivated look at attempting suicide.

SB ***Planned to attempt***

A range of activities including psychological preparation from seminal groundwork to a full development of a design to attempt suicide. Some actions may be overt like procuring materials, other may be covert like preparing personal items to be found after death.

SB ***Favourable attitude towards suicide***

A deep-rooted convincement that the planned action to attempt suicide will work and should move forward even though there may be swaying back to some ideation and refinements on the planned actions to attempt suicide.

SB ***Attraction to death***

A stage where the decision to attempt or die by suicide is being deeply mulled but there is a positive outlook towards ending one's own life. A positive outlook to death develops

and the fear of death which may have kept the person from progressing into decisive planning is gone.

SB ***Decided but not attempted***

The person has reached a final stage of the decision process and resolved that suicide is the way forward but has yet to decide when and possibly the minute details of how suicide will be attempted.

SB ***Prepared to attempt***

The person has finally decided all the details of suicide, is satisfied with his or her own plan and decision and is ready to attempt.

Variable 24 H **Attempted before**

Any number of attempted suicides whether by the same method of death or different before the completion of suicide.

Variable 25 H **History of suicide in the family**

Record of other members of the family of the deceased, up to a third degree, who have also died by suicide.

Variable 26 H **History of suicide by close friends**

Record of friends of the deceased who have died by suicide.

Variable 27 SB **Suicide Note**

A message left by the deceased before completing suicide.

Variable 28 SB **Last known action**

The last engagement or act of the deceased as known by the survivors.

Variable 29 D **Employment**

Paid work or activity in the public or private sector, self-employment, unemployment or pension.

Variable 30 D **Income**

Money returns and received on a regular basis from employment, work or investments.

Variable 31 D **Education**

The level of systematic instruction received from basic compulsory education to higher and tertiary level.

Variable 32 D **Skills**

Any ability to do a particular job well ranging from general ability to specialised competencies.

Variable 33 D **Physical Disability**

A limitation of one's ability to function or an impairment including vision and hearing impairments which limits mobility or dexterity.

Variable 34 D **Chronic Illness**

A medical condition or disease including diabetes, hypertension, digestive, pulmonary and coronary diseases, degenerative diseases like Alzheimer's. Parkinson's and Dementia and other progressive diseases which persists over time and which a person has to live with for a long period of time.

Variable 35 D **Mental Health**

The deceased's psychological, psychiatric and emotional well-being and if the deceased had any disorders affecting mood, hopelessness and anxiety and may include depression, bi-polar disorder, personality and sleeping disorders and others.

Variable 36 LE **Child Abuse**

The physical or psychological neglect or ill-treatment or sexual exploitation the deceased may have suffered.

Variable 37	LE	**Trauma or loss of function** A highly distressing experience, physical injury or loss of one's ability to function normally especially when using limbs.
Variable 38	LE	**Financial Difficulties** A complication and inability to pay debts and support oneself and dependents with money or funds.
Variable 39	LE	**Loss of Employment** Losing a job or the forced termination of a job or work.
Variable 40	LE	**Marriage or relationship breakdown** The erosion of the relationship with a significant other in marriage or long-term relationship leading up to a dissolution of the same relationship.
Variable 41	LE	**Loss of child custody** The *de facto* or legal termination of guardianship over one's own children ranging from legal custody or the ability to take decisions about the children to physical custody or the ability to provide shelter and care for the children.

Variable 42 LE **Death of loved one**

The demise or loss of a significant other which brings on bereavement and deep sorrow.

Variable 43 LE **Life threatening illness**

A potentially fatal illness or injury which causes uncertainties about the ability to live and increases the possibility of early death.

Variable 44 LE **Legal Problems**

The complications and complexities of being in a dispute with someone in a Court of law arising from rights infringements or other civil matters.

Variable 45 LE **Criminality**

Engaging in a behaviour that is contrary to what is expected or is explicitly forbidden by law resulting in infractions with the police or other law enforcement agencies.

Variable 46 LE **Other Life Event**

Any other significant incident, experience, occurrence or episode which might have happened in the life of the deceased and which might have had a particular affect over events and over the general course of his or her own life.

A Note on the Variables

The variables just described were, for practical purposes, expanded into 61 working variables in SPSS (as described in Appendix 1 – The coding dictionary) *(SPSS stands for Statistical Package for Social Sciences and was chosen as it is the preferred software in this field of study)*. This was a natural process as some variables could have more than one outcome. For example, in Variable 16 – Vices, a person might have smoked, had an alcohol problem and used drugs at the same time. Obviously, these had to be separated for practical annotation. As already indicated, the 46 variables were expanded into 61. One variable (28 - The last known action of the deceased) was not utilised in any analysis, as it had a descriptive outcome which could not be compared using SPSS.

Source of Data

All processed data were solely collected from official reports written and recorded by police officers in Malta. There is a single police force in Malta officially designated as the Malta Police Force (MPF), which was established in 1814. Until 2001, any report to the police was registered in the, so called, "Occurences Book" held in every police station. This register was reviewed by higher police officers and any actions taken were recorded as an "occurrence" within the same register. The first computerised system of police reporting was introduced in 2001 but the old manual system and the new *Police Incident Reporting System* (PIRS) were kept running in parallel but whilst it was obligatory to record any incident in the "Occurrence book", it was not obligatory for police officers to record it in the PIRS. The old manual system was phased out and on 1st January 2003 it was abolished and the new PIRS came into force. As it was not obligatory to record any incident in the PIRS, some officers opted to keep recording incidents on manual registers up until the obligatory change over in 2003. Data before 2003 was, therefore, partly on the PIRS and partly in any of the 52 police stations

around the islands. The PIRS was renamed the *National Police System* (NPS) in 2016. It was, therefore, decided that for the sake of completeness of data, this study would consider data from 2003 up to 2017. The author, a serving police officer, had full access.

The law in Malta prescribes that every death on the islands should be recorded and a "Certificate of death and cause thereof" issued and signed by a warranted medical practitioner and registered at the Public Registry.

A formal police investigation is launched in four different scenarios: where a person dies unexpectedly or without known cause; where a person is suspected of having died by suicide; where death is caused by serious injuries, accidents or occupational-related matters; and where the death is suspected to have been caused by or due to a criminal offence.

An ordinary medical practitioner cannot release a formal "Certificate of death and cause thereof" where or when death occurred in the circumstances of any of the four occurrences described above. In such cases an ordinary medical practitioner may only issue a certificate confirming death, whereas the "Certificate of death and cause thereof" is issued by the Court-appointed pathologists (as explained in the below).

In any of the four circumstances indicated above, the law prescribes that the police shall inform a Magistrate and a parallel investigation called a Magisterial Inquiry be appointed. Apart from standard investigations, a Magisterial Inquiry invariably includes a medico-legal examination and an autopsy, which should determine the cause of death for the formal "Certificate of death and cause thereof" to be issued. Medico-legal investigations are conducted by Magistrate-appointed forensic pathologists and a warranted medico-legal expert, and include any information acquired from the autopsy itself, background information from medical history files, and other information gathered through interviews with family members or acquaintances. The two investigations, albeit independent, are associated, as the outcome of the autopsy is communicated to the police for their investigation and this is rigorously recoded in the police report on the matter.

Macro-level Data

Any data collected by the police in the course of a death investigation, including those of Maltese nationals, foreigners and death reports on maritime vessels in Maltese territorial waters, is recorded in the "National Police System" (NPS). This searchable computerised database is only accessible to serving police officers, and holds data regarding reports and investigations carried out by the Force, including official versions of events and annotations or remarks from senior officers.

The NPS reports on death investigations are classified into four categories: *Homicide, Fatal Incident, Suicide*, and *Sudden Death*. Each classification has further sub categories. The primary classification *Suicide* is divided in two secondary classifications: *attempted suicide,* which relates to cases where the person made an attempt to die by suicide and *completed suicide,* where the person's death is recorded. For the purpose of this study, only cases where death was classified as suicide between 2003 and 2017 were extracted from the NPS and processed accordingly.

Both secondary classifications are further divided into a third classification based on the method of attempt or method of death: For the purpose of this study, only the third classification of suicide was considered, that is suicide by hanging, by jumping, by firearm, by substance, by others.

A report is classified under a particular category based on the final outcome of the investigations carried out by the police, but may also include the findings of the medico-legal autopsy investigations carried out as part of the Magisterial Inquiry. The classification is thus conclusive, and for the whole period under review there were no cases where the separate investigations by the police and the Inquiring Magistrate did not reach the same conclusion.

In total, 359 reports classified under any one of the five categories or methods of suicide were identified, examined, reviewed and processed.

Micro-Level Data

Each relevant report of suicide reported to the police in Malta between 2003 and 2017 was accessed and examined. Official police reports are mainly divided in two: the initial part is where details of the case, details of the persons involved and other particulars are inputted. The second and most important part is the "Action taken" section of the report. This is a free-area where all details of the investigation are written. It takes the form of a notebook, where the initial responders, the attending Sergeant and the investigative officer input the data relating to the case, most often building a chronological jigsaw puzzle of the case. This is reviewed by senior officers, who can also leave comments and make notes.

The examination of each report of death by suicide consisted of collecting data relating to the 46 variables described earlier. Details for each case were manually inserted and later transposed into an SPSS file.

Cross-Tabulation

The use of cross-tabulation as the preferred method of analysis is a circumstantial development from the collected data. Most of the collected data is nominal in its measure and categorical in nature, therefore the most straightforward and clear method of bringing together different variables in the examination of their relationship was cross-tabulation. The method is most suitable to displaying the interaction and association between two variables in a single matrix. It is also the statistical method used most often to expose the multivariate frequency distribution of variables.

A series of contingency tables (as cross tabulation is sometimes referred to) were prepared and are presented in Chapter 6 and Chapter 7. These tables display different variables and their relationship to each other, mostly through percentages which indicate the type of relationship the variables have. Most of the tables' dimensions presented in the results chapters, reported as *R x C*, have different numbers of row categories (r) against different numbers of categories for the variable in the column (c).

These tables may be described as a 2D image of the collected data on suicide in the Maltese islands.

Potential Limitations

This study is based on data obtained from one source, that is, police reports. This may affect the study in different ways: both positively - as this study has the advantage of having all the information on all the available cases and not just a sample, and less positively - as it may be too dependent on subjective information acquired by the police in their course of duty.

Subjectivity is somewhat mitigated by having a standard classification of cases of suicide. The police, however, does not have a standard procedure on how to review cases and their classification. Some cases, especially those which are not initially classified as suicide due to the case being reported as something else (for example; a "Missing Person") may therefore be mis-classified. In some cases, even though through investigations the case would have been treated as a suicide, the actual or formal classification was not changed and it was thus not recorded as a suicide in official statistics. The same procedure may be repeating itself by the misclassification of substance abuse cases, particularly when a case is initially treated as a substance overdose but only later deemed to be suicide.

The reports reviewed as part of this study were mostly prepared by more than one officer, and can thus reflect what the reporting officers, in their own way, saw fit to report. The police in Malta do not follow a standard operating procedure in cases of suicide. In a way, this measure of subjectivity is generalised across the Force, as some information which traditionally was not collected by the police is not collected or barely collected throughout all the examined reports (for example; the psychological, psychiatric or emotional well-being of the deceased).

Coupled with this, the police officers who gathered all the information on which the study has been built did so as part of their investigation and not as part of any academic

research, and thus what was considered as unimportant in their investigation was, most often, discarded.

Most of the collected data were processed using cross-tabulations. As powerful as they might be, cross tabulations still have some limitations. The measurement level for most cross tabulations is nominal. Where a scale or continuous measure is used, like in the variable “age”, the variable is converted to a categorical one. This may limit some important data like variation. In this study, this is mitigated by limiting the number of Scale or Continuous variables to one variable “age” only where a categorisation was more practical. This is done by examining age groups rather than examined age in singular years.

Chapter 6 - The Nature of Suicide in Malta (Results Chapter 1)

Overview

This chapter is a descriptive analysis of demographical data relating to deaths by suicide in the Maltese islands. It is a scientific presentation of all the reported deaths, which upon investigation were deemed to be suicide by the police in Malta. In this chapter, the complete demographic data about the persons who died by suicide in Malta for the period of fifteen years between 2003 and 2017 is presented. Apart from this demographic data, inferential statistics about the methods of death used in all the recorded suicides are presented. Data relating to other known risk factors and protective factors of suicide have been added.

All presented data were collected from the official reports recorded in the National Police System of the Malta Police Force, which has sole jurisdiction to investigate any death occurring in all the Maltese islands. Every effort was made to collate all the available data for each recorded death. However, in some cases not all data were available, as it was either not collected or recorded by the police. This explains the gaps and variations in some of the total number of cases included in the analyses. Further analysis of the missing, uncollected or unrecorded data is presented in Chapter 8.

Results

Demographic Factors

The total number of deaths by suicide recorded in Malta between 1st January 2003 and 31st December 2017 was 359. Table 1 shows the number of deaths by suicide in the indicated period as recorded by the Malta Police Force per year during the period under review. Of the total number of recorded suicides in the indicated period *(N = 359)*, 313

or 87.2% were males whilst 46 or 12.8% were females as indicated in Table 1. This results in a mean rate of 4.9 males and 0.7 females or a 7:1 ratio between sexes.

Table 1.

Recorded deaths by suicide by gender per year 2003 – 2017

	Male	Female	Total
2003	16	2	18
2004	15	9	24
2005	14	2	16
2006	19	3	22
2007	24	1	25
2008	14	3	17
2009	28	3	31
2010	30	1	31
2011	20	0	20
2012	20	7	27
2013	22	0	22
2014	23	3	26
2015	30	5	35
2016	18	3	21
2017	20	4	24
Total	313	46	359
Percent	87.2%	12.8%	

The distribution of deaths by suicide in Malta between 2003 and 2017 as distributed by six age brackets is shown in Table 2. The highest number of suicides was recorded in the age bracket between 46 and 60 years old (N = *100*). The lowest number of suicides occurred within the youngest of the age brackets, that is between 14 and 21 years (N = *19*). In 5 cases, the police did not record the age of the person.

Table 2.

Number of suicides in Malta (2003 – 2017) distributed by age

Year / Age	14-21	22-35	36-45	46-60	61-75	over 75	Total
2003	0	8	1	4	3	2	18
2004	3	2	5	7	3	4	24
2005	0	1	4	5	5	1	16
2006	2	5	3	7	3	2	22
2007	1	7	6	6	4	1	25
2008	0	3	2	5	5	1	16
2009	2	12	5	4	6	1	30
2010	1	5	13	5	3	3	30
2011	1	2	4	9	4	0	20
2012	1	4	8	8	5	1	27
2013	1	4	5	9	2	1	22
2014	3	0	8	8	2	5	26
2015	2	12	7	12	2	0	35
2016	0	4	9	5	0	2	20
2017	2	4	2	6	7	2	23
Total	19	73	82	100	54	26	354

Ethnicity

The ethnicity of the persons who died by suicide in Malta during the period under review was recorded in 357 cases, of which 343 or 95.5% were of European origin, 9 were of African origin, 3 were of Asian heritage and 2 were of Arab descent (Table 3).

Table 3.

Race of persons who died by suicide in Malta 2003 – 2017

	Frequency	Percent
European	343	95.5 %
African	9	2.5 %
Asian	3	0.8 %
Arab	2	0.6 %
Not Recorded	2	0.6 %
Total	359	100.0 %

Marital Status

The marital status of persons who died by suicide in Malta between 2003 and 2017 is shown in Table 4. The marital status of the deceased was recorded in 243 cases. The majority were married or in a stable relationship *(N = 174)* translating into 48.5% of the total number of cases where marital status was recorded. In 57 of the recorded cases the deceased was single, whilst in 7 cases, the deceased was divorced or separated or had his or her marriage annulled and was not in another relationship before the death occurred. In another 5 cases, the deceased was widowed. No information was available in 116 cases.

Table 4.

Marital status of persons who died by suicide in Malta 2003 – 2017

	Frequency	Percent
Single	57	15.9 %
Married / In a Relationship	174	48.5 %
Divorced / Annulled / Separated	7	1.9 %
Widowed	5	1.4 %
Not Recorded	116	32.3 %
Total	359	100.0 %

Sexual Orientation

The sexual orientation of the persons who died by suicide in Malta in the period under review is shown in Table 5. There are only two categories: Heterosexual representing heterosexual-oriented persons and Non-Heterosexual representing LGBTIQ or lesbian, gay, bi-sexual, transgender, intersex and queer – oriented persons. Of the 359 cases of recorded death by suicide between 2003 and 2017, no information on the sexual orientation of the deceased was available in 229 cases whilst in 125 cases, the deceased person had a heterosexual orientation. In 5 cases, the person who died by suicide had a

non-heterosexual orientation pertaining to one of the LGBTIQ cohort as shown in Table 5.

Table 5.

Sexual orientation of persons who died by suicide in Malta 2003 – 2017

	Frequency	Percent
Heterosexual	125	34.8 %
Non-heterosexual	5	1.4 %
Not Recorded	229	63.8 %
Total	359	100.0 %

Religion

The religious beliefs of 79.9% of all persons who died by suicide in Malta between 2003 and 2017 are presented in Table 6 below. In most cases, the deceased person was catholic *(N = 275).* There were also 5 recorded cases of Muslims and 7 other cases of different denominations including different Christian denominations and far eastern religions. In 72 cases, the religion of the deceased person was not recorded by the police.

Table 6.

Religion of persons who died by suicide in Malta 2003 – 2017

	Frequency	Percent
Catholic	275	76.6 %
Muslim	5	1.4 %
Others	7	1.9 %
Not Recorded	72	20.1 %
Total	359	100.0 %

Nationality and Immigration Status

The immigration status of all the persons who died by suicide in Malta between 2003 and 2017 is shown in Table 7. The first two categories in the table, that is "Country national" and "Naturalised national" refer to Maltese nationals who in the first category obtained Maltese nationality by birth and who in the second category obtained nationality by naturalisation. The other two categories, that is "Irregular immigrant" and "Regular immigrant/ Visitor" refer to foreigners who in the first category only held a temporary permission to live in Malta on humanitarian grounds and in the second category to foreigners who held a regular visa. Of the 359 deaths by suicide recorded in Malta between 2003 and 2017, 302 deaths pertained to Maltese nationals and 57 were of foreign nationality. Of the 302 Maltese nationals, 294 were country nationals whilst 8 acquired Maltese citizenship by naturalisation. Of the 57 foreign nationals who have died by suicide in Malta in the period under review, 9 were irregular immigrants and 48 were either nationals from another European Union country, thus enjoying automatic residence permission or third country nationals who had a residence permit or a visa to enter the country.

Table 7.

Frequency of death by suicide according to immigration status

	Frequency	Percent
Country national	294	81.9 %
Naturalised national	8	2.2 %
Irregular immigrant	9	2.5 %
Regular immigrant/Visitor	48	13.4 %
Total	359	100.0 %

Of the 48 foreigners, 7 were tourists visiting the islands, 5 were mariners while 1 was an irregular immigrant with no residence permit. The nationalities of the foreigners who died by suicide in Malta between 2003 and 2017 are indicated in Table 8.

Table 8.

Nationality of Foreigners who died by suicide in Malta 2003 – 2017

Nationality	Frequency
United Kingdom	19
Italy	5
Romania	4
Germany	3
Eritrea	2
Mali	2
Netherlands	2
Philippines	2
Poland	2
Belgium	1
China	1
Denmark	1
Egypt	1
Ethiopia	1
Ghana	1
Hungary	1
Japan	1
Latvia	1
Montenegro	1
Serbia	1
Somalia	1
Sudan	1
Sweden	1
Tunisia	1
United States of America	1
Total	57

Data on deaths by suicide per year under review as distributed by nationality are described in Table 9. No deaths by suicide of foreigners were recorded in 2005 and 2006. The highest number of foreigners completing suicide in Malta was recorded in

2015 *(N = 8)*. The highest percentage of foreign nationals who died by suicide in Malta in one year in the period under review was recorded in 2013 (31.8%)

Table 9.

Distribution of death by suicide per nationality in Malta between 2003 and 2017

	Maltese	Foreigner	Total
2003	17	1	18
% within Year of Death	94.4%	5.6%	
2004	22	2	24
% within Year of Death	91.7%	8.3%	
2005	16	0	16
% within Year of Death	100.0%	0.0%	
2006	22	0	22
% within Year of Death	100.0%	0.0%	
2007	24	1	25
% within Year of Death	96.0%	4.0%	
2008	13	4	17
% within Year of Death	76.5%	23.5%	
2009	27	4	31
% within Year of Death	87.1%	12.9%	
2010	25	6	31
% within Year of Death	80.6%	19.4%	
2011	16	4	20
% within Year of Death	80.0%	20.0%	
2012	21	6	27
% within Year of Death	77.8%	22.2%	
2013	15	7	22
% within Year of Death	68.2%	31.8%	
2014	19	7	26
% within Year of Death	73.1%	26.9%	
2015	27	8	35
% within Year of Death	77.1%	22.9%	
2016	18	3	21
% within Year of Death	85.7%	14.3%	
2017	20	4	24
% within Year of Death	83.3%	16.7%	
Total	302	57	359
% within Year of Death	84.1%	15.9%	

Localities

Between 2003 and 2017, deaths by suicide were recorded in all but 10 villages within the whole country; 3 in the region of Malta and 7 in the region of Gozo and Comino as indicated by Table 10. The highest number of deaths by suicide was recorded in the two largest localities in Malta, that is Birkirkara and San Pawl il-Bahar *(N = 23).* The localities where no deaths by suicide were recorded during the period under review were Had-Dingli, Il-Furjana and L-Imtarfa in Malta and Il-Fontana, Ghajnsielem, Il-Munxar, Il-Qala, San Lawrenz, Ta' Sannat and Ix-Xewkija in Gozo. Table 10 shows the distribution of recorded deaths by suicide in every locality in Malta according to the LAU 2 classification used by the National Statistics Office (NAO, 2019) as defined in Chapter 5. It also indicates that five deaths by suicide were recorded to have happened on board vessels at sea within the territorial waters of Malta. The same table also indicates that seven tourists and another foreign national who was homeless and had no valid residence permit to stay on the islands died by suicide whilst visiting the islands.

Table 10.

Distribution of suicide by localities in Malta and Gozo 2003 – 2017

LAU 2	Locality	Frequency	LAU 2	Locality	Frequency
1	Valletta	10	37	Il-Mellieħa	3
2	Mdina	1	38	L-Imġarr	1
3	Il-Birgu (Vittoriosa)	4	39	Il-Mosta	18
4	L-Isla (Senglea)	1	40	L-Imqabba	6
5	Bormla (Cospicua)	4	41	L-Imsida	6
6	Hal Qormi	18	42	Il-Munxar	0
7	Haż-Żebbuġ	7	43	In-Nadur	1
8	Haż-Żabbar	12	44	In-Naxxar	13
9	Is-Siġġiewi	5	45	Raħal Ġdid (Paola)	9
10	Iż-Żejtun	11	46	Pembroke	2
11	Victoria	2	47	Tal-Pietà	4
12	H'Attard	6	48	Il-Qala	0
13	Hal Balzan	5	49	Il-Qrendi	1
14	Birkirkara	23	50	Ir-Rabat	8
15	Birżebbuġa	13	51	Hal Safi	2
16	Had-Dingli	0	52	San Ġiljan	3
17	Il-Fgura	9	53	San Ġwann	10
18	Il-Furjana	0	54	San Lawrenz	0
19	Il-Fontana	0	55	San Pawl il-Bahar	23
20	Il-Gudja	1	56	Ta' Sannat	0
21	Il-Gżira	3	57	Santa Luċija	3
22	Għajnsielem	0	58	Santa Venera	3
23	L-Għarb	1	59	Tas-Sliema	11
24	Hal Għargħur	1	60	Is-Swieqi	5
25	L-Għasri	1	61	Ta' Xbiex	3
26	Hal Għaxaq	2	62	Hal Tarxien	3
27	Il-Ħamrun	12	63	Ix-Xagħra	1
28	L-Iklin	2	64	Ix-Xewkija	0
29	Il-Kalkara	3	65	Ix-Xgħajra	3
30	Ta' Kerċem	1	66	Iż-Żebbuġ	3
31	Hal Kirkop	3	67	Iż-Żurrieq	8
32	Hal Lija	3	68	L-Imtarfa	0
33	Hal Luqa	5		At Sea	5
34	Il-Marsa	10		Homeless	1
35	Marsaskala	9		Tourist	7
36	Marsaxlokk	5		Total	359

The number of deaths by suicide recorded in each district and region and of non-residents together with the total for each of the years in the indicated period are shown in Table 11. The highest number of deaths by suicide in one year was recorded in 2015 *(N = 35)* and the lowest was recorded in 2005 *(N = 16)*. The mean frequency for the 15-year period under review was of 22.5 deaths by suicide in the region of Malta and 0.5 deaths by suicide in the region of Gozo and Comino resulting in a mean frequency of 23.9 deaths by suicide per annum for the whole country during the period under review.

The lowest number of deaths by suicide per district of residence was recorded in the district of Gozo and Comino *(N = 8)*, whilst the highest number was recorded in the Northern Harbour district *(N = 103).*

The difference between two proportions z-test was used to determine whether suicide rates varied significantly between the region of Malta and the region of Gozo and Comino. The null hypothesis specifies that suicide rates vary marginally between the Islands and is accepted if the p-value exceeds the 0.05 level of significance. The alternative hypothesis specifies that suicide rates vary significantly between the Islands and is accepted if the p-value is less than the 0.05 criterion. From a total of 391829 individuals living in Malta, there were 351 suicides yielding a suicide rate of 0.0895%. On the other hand, from a total of 31552 individuals living in Gozo and Comino, there were only 8 suicides yielding a suicide rate of 0.0254%. The difference between two proportions z-test yielded a z-score of 3.77 and a *p* - value of 0.00016 indicating that the difference between the two percentages is significant and not attributed to chance. Hence, we can generalize that suicide in the region of Gozo and Comino is less prevalent than in the region of Malta.

Table 11.

Recorded deaths by suicide in Malta per year by district and region

Year	Southern Harbour	Northern Harbour	South Eastern	Western	Northern	*Malta Region*	Gozo & Comino	Non-Resident	Total
2003	7	4	3	2	1	17	0	1	18
2004	4	5	3	4	6	22	1	1	24
2005	2	5	2	3	4	16	0	0	16
2006	5	5	3	3	6	22	0	0	22
2007	6	10	2	5	2	25	0	0	25
2008	2	8	1	2	4	17	0	0	17
2009	10	4	10	2	3	29	2	0	31
2010	11	7	4	1	6	29	0	2	31
2011	3	7	3	0	3	16	2	2	20
2012	4	8	5	3	4	24	1	2	27
2013	3	6	3	2	5	19	1	2	22
2014	5	6	8	3	2	24	0	2	26
2015	6	11	8	4	5	34	0	1	35
2016	4	9	3	2	2	20	1	0	21
2017	4	8	3	4	5	24	0	0	24
Total	76	103	61	40	58	338	8	13	359
Mean	5.1	6.9	4.1	2.7	3.9	22.5	0.5	0.9	23.9

The national population figures published by the National Statistics Office (2019) were utilised to obtain the rate of suicide per year for each district and region of Malta. Population figures show that the Northern Harbour is the most populous district with an average of 126,781 residents during the 15 years under review. The Northern Harbour district was followed by the Southern Harbour district at 80,927 residents, the South Eastern district at 63,392 residents, the Northern district at 63,091 residents, the Western district at 58,055 residents and Gozo and Comino at 31,551 residents.

The rate of suicide per annum, based on the number of deaths by suicide and the total yearly population figures explained above is shown in Table 12. The mean rate shown in Table 12 is per 100,000 inhabitants. There was a mean rate of 5.7 deaths by suicide per 100,000 inhabitants in the region of Malta and 1.7 deaths by suicide per 100,000

inhabitants in the region of Gozo and Comino for the period under review. There was a mean rate of 5.6 deaths by suicide per 100,000 inhabitants for all the Maltese islands per annum for the period under review.

Table 12.

Rate of recorded suicides per 100,000 inhabitants per year by district and region

Year	Southern Harbour	Northern Harbour	South Eastern	Western	Northern	Malta *(Region)*	Gozo & Comino	Total*
2003	8.2	3.3	5.4	3.6	2.0	4.6	0.0	4.5
2004	4.7	4.0	5.4	7.2	12.0	5.9	3.1	6.0
2005	2.5	4.2	3.4	5.3	7.0	4.3	0.0	4.0
2006	6.2	4.2	5.0	5.3	10.3	5.9	0.0	5.4
2007	7.5	8.4	3.3	8.7	3.4	6.6	0.0	6.1
2008	2.5	6.7	1.6	3.5	6.6	4.5	0.0	4.1
2009	12.5	3.3	15.9	3.5	4.9	7.6	6.4	7.5
2010	13.8	5.8	6.3	1.7	9.6	7.6	0.0	7.5
2011	3.8	5.8	4.7	0.0	4.7	4.1	6.4	4.8
2012	5.0	6.5	7.7	5.1	6.2	6.1	3.2	6.4
2013	3.8	4.7	4.5	3.4	7.6	4.8	3.2	5.1
2014	6.3	4.5	11.9	5.1	2.9	5.9	0.0	5.9
2015	7.5	7.9	11.7	6.7	7.0	8.1	0.0	7.8
2016	5.0	6.3	4.3	3.3	2.7	4.7	3.1	4.6
2017	4.9	5.3	4.3	6.6	6.4	5.4	0.0	5.0
Mean	6.3	5.4	6.4	4.6	6.2	5.7	1.7	5.6

*including deaths by suicide committed by non-residents (N = 13)

Method of suicide

The distribution of the seven methods of suicide mostly used in Malta are shown in Table 13 together with another generic category named “Other” which included three cases of self-asphyxia and one case each of death by physical exhaustion, driving over a cliff edge and electrocution. The three main preferred methods of suicide in Malta were hanging with 180 recorded cases or 50.1% of the total number of suicides, followed by

jumping off heights *(N = 91)* representing 25.3% and by using firearms *(N = 45)* representing 12.5 % of the total number of suicides.

Table 13 indicates that between 2003 and 2010, the percentage of suicides by hanging per year was lower than the average of 50.1% for the whole period under review. It also indicates that between 2011 and 2017, except for the year 2014, the average percentage of suicides by hanging was higher that the indicated average.

The average percentage of suicides by jumping off heights is 25.3%. Table 13 shows that between 2003 and 2008 with the exception of 2007, the percentage of cases of suicide by jumping was higher than the indicated average. The number of cases is lower than the average between 2009 and 2017 with the exception of 2010 (25.8%) and 2015 (26.9%) where the percentage is very marginally above the average. The percentage of suicides by jumping was at its lowest levels in 2016 (9.5%) and 2017 (8.3%).

Table 13.

Distribution of suicides in Malta between 2003 and 2017 per method of death

	Hanging	Firearm	Jumping	Sub-stance	CO Poison	Drown-ing	Self-Stabbing	Others	Total
2003	8	2	6	0	1	1	0	0	18
% within year	44.4%	11.1%	33.3%	0.0%	5.6%	5.6%	0.0%	0.0%	
2004	9	2	10	1	0	0	2	0	24
% within year	37.5%	8.3%	41.7%	4.2%	0.0%	0.0%	8.3%	0.0%	
2005	6	2	6	0	0	1	0	1	16
% within year	37.5%	12.5%	37.5%	0.0%	0.0%	6.3%	0.0%	6.3%	
2006	7	3	11	1	0	0	0	0	22
% within year	31.8%	13.6%	50.0%	4.5%	0.0%	0.0%	0.0%	0.0%	
2007	11	5	6	1	2	0	0	0	25
% within year	44.0%	20.0%	24.0%	4.0%	8.0%	0.0%	0.0%	0.0%	
2008	7	2	6	0	0	1	1	0	17
% within year	41.2%	11.8%	35.3%	0.0%	0.0%	5.9%	5.9%	0.0%	
2009	15	6	5	0	2	0	2	1	31
% within year	48.4%	19.4%	16.1%	0.0%	6.5%	0.0%	6.5%	3.2%	
2010	14	7	8	1	0	0	1	0	31
% within year	45.2%	22.6%	25.8%	3.2%	0.0%	0.0%	3.2%	0.0%	
2011	13	0	5	2	0	0	0	0	20
% within year	65.0%	0.0%	25.0%	10.0%	0.0%	0.0%	0.0%	0.0%	
2012	17	1	5	1	1	2	0	0	27
% within year	63.0%	3.7%	18.5%	3.7%	3.7%	7.4%	0.0%	0.0%	
2013	13	2	5	0	0	1	1	0	22
% within year	59.1%	9.1%	22.7%	0.0%	0.0%	4.5%	4.5%	0.0%	
2014	12	4	7	0	1	1	0	1	26
% within year	46.2%	15.4%	26.9%	0.0%	3.8%	3.8%	0.0%	3.8%	
2015	20	3	7	1	2	0	1	1	35
% within year	57.1%	8.6%	20.0%	2.9%	5.7%	0.0%	2.9%	2.9%	
2016	13	3	2	2	0	0	0	1	21
% within year	61.9%	14.3%	9.5%	9.5%	0.0%	0.0%	0.0%	4.8%	
2017	15	3	2	1	0	1	1	1	24
% within year	62.5%	12.5%	8.3%	4.2%	0.0%	4.2%	4.2%	4.2%	
Total	180	45	91	11	9	8	9	6	359
% within total	50.1%	12.5%	25.3%	3.1%	2.5%	2.2%	2.5%	1.7%	

Risk Factors and Protective Factors

Mental Health

Various factors were identified through the literature as increasing the risk of completing suicide and others as having a protective value by reducing such risk. One of the strongest risk factors for suicide is having mental health issues. Data regarding mental health issues were only annotated by the police in 33.1% of the cases, *(N = 119).* In 13.93% of the cases, *(N = 50),* a specific diagnosis was recorded as shown in Table 14. The most common mental disorder recorded by the police was depression in 10% of the cases of suicide recorded in the period under review, (N = 36). In 19.2% of the suicides recorded in the period under review, *(N = 69)* the police noted that the deceased was under psychiatric care. In 66.9% of the cases, *(N = 240),* no data about mental health issues were collected.

Table 14.

Persons with mental health issues who died by suicide in Malta 2003 – 2017

	Frequency	Percent
Depression	36	10.0 %
Hopelessness	3	0.8 %
Bi-Polar Disorder	1	0.3 %
Anxiety Disorders	3	0.8 %
Mood Disorders	2	0.6 %
Schizophrenia	2	0.6 %
Personality Disorders	3	0.8 %
Other Psychiatric Care	69	19.2 %
Not Recorded	240	66.9 %
Total	359	100.0 %

Physical Health

In 38 cases, data about any chronic illness suffered by the persons who died by suicide in the period under review were collected. In 3.6% of the cases, *(N = 13)*, the deceased had no known chronic medical condition. In 6.96% of the cases, *(N = 25)*, the deceased had a chronic condition which was recorded. Such chronic conditions included diabetes, hypertension, coronary-related diseases and others as indicated in Table 15. In 89.4 % of the cases, *(N = 321)*, these data were not available.

Table 15.

Persons with chronic illnesses who died by suicide in Malta 2003 – 2017

	Frequency	Percent
None	13	3.6 %
Diabetes	1	0.3 %
Hypertension	4	1.1 %
Digestive	1	0.3 %
Pulmonary	1	0.3 %
Coronary	4	1.1 %
Alzheimer's	1	0.3 %
Other	13	3.6 %
Not Recorded	321	89.4 %
Total	359	100.0 %

In 3.6% of the total number of suicides recorded in the period under review, *(N = 13)* the deceased had some form of physical disability. No data was collected by the police in 96.4% of the cases, *(N = 346).* (Table 16)

Table 16.

Persons with physical disabilities who died by suicide in Malta 2003 – 2017

	Frequency	Percent
Restricts Movement	10	2.8 %
Impairs Movement	1	0.3 %
Vision	1	0.3 %
Hearing	1	0.3 %
Not Recorded	346	96.4 %
Total	359	100.0 %

The Family

Tables 17 to 22 show the living status of the parents, the siblings and the children of the persons who died by suicide in Malta in the period under review as well as the type of contact the deceased had with these members of the family. Table 17 shows that 88 persons who died by suicide in the period under review had parents who were still living whilst 18 others had parents who were deceased when they died by suicide. In 253 cases, this information was not recorded. Of the 88 persons who had parents still living when they died by suicide, 82 had regular contact whilst 4 had occasional contact and 2 others had no contact at all as indicated in Table 18.

Table 17.

Living status of parents of persons who died by suicide in Malta 2003 – 2017.

	Frequency	Percent
Living	88	24.5%
Deceased	18	5.0%
Not Recorded	253	70.5%
Total	359	100.0%

Table 18.

Contact with their parents of persons who died by suicide in Malta 2003 – 2017.

	Frequency	Percent
Regular	82	22.8%
Occasional	4	1.1%
No contact	2	0.6%
Deceased	18	5.0%
Not Recorded	253	70.5%
Total	359	100.0%

The living status of the siblings, if any, of the persons who died by suicide in Malta between 2003 and 2017 are shown in Table 19. In 115 cases, the person who died by suicide was survived by his or her siblings. Of these 110 had regular contact with their siblings whilst 2 had occasional contact. In 3 cases, the deceased had no contact with his or her siblings whilst in 244 cases, no data were collected (Table 20).

Table 19.

Living status of siblings of persons who died by suicide in Malta 2003 – 2017

	Frequency	Percent
Living	115	32.0%
Not Recorded	244	68.0%
Total	359	100.0%

Table 20.

Contact with their parents of persons who died by suicide in Malta 2003 – 2017

	Frequency	Percent
Regular	110	30.6%
Occasional	2	0.6%
No contact	3	0.8%
Not Recorded	244	68.05%
Total	359	100.0%

The living status of the children, of the persons who died by suicide in Malta between 2003 and 2017 is shown in Table 21 and the type of contact these had is shown in Table 22. In 91 cases, the person who died by suicide had children who were still living. Of these, 89 had regular contact whilst 2 had occasional contact. In 268 cases, no data were available (Table 21).

Table 21.

Living status of children of persons who died by suicide in Malta 2003 – 2017

	Frequency	Percent
Living	91	25.3%
Not Recorded	268	74.7%
Total	359	100.0%

Table 22.

Contact with their parents of persons who died by suicide in Malta 2003 – 2017

	Frequency	Percent
Regular	89	24.8%
Occasional	2	0.6%
Not Recorded	268	74.7%
Total	359	100.0%

Other Data Relating to Planning

Signs of planning or impulsivity were noted by the police in 121 cases. Table 23 indicates the number of cases where data about planning were available or where signs of impulsivity were noted and recorded by the police in their investigation of a death by suicide. In 238 cases, this information was not recorded.

Table 23.

Persons who died by suicide who have shown signs of planning or impulsivity before their death in Malta 2003 – 2017

	Frequency	Percent
Planned	105	29.2 %
Impulsive	16	4.5 %
Not Recorded	238	66.3 %
Total	359	100.0 %

In 52.6% of the total number of deaths by suicide, information about a suicide note was recorded by the police, *(N = 189).* In 59 of these cases, a suicide note left by the deceased was noted. In 130 cases, no suicide note was left by the deceased. In the remaining 47.4% *(N = 170)* there were no recorded data on a suicide note. (Table 24)

Table 24.

Data regarding the existence or not of a suicide note in cases of suicide in Malta 2003 – 2017

	Frequency	Percent
Suicide note found	59	16.4 %
No suicide note left	130	36.2 %
Not Recorded	170	47.4 %
Total	359	100.0 %

Conclusion

Suicide in Malta is more common in males, aged between 46 and 60 years and of Maltese descent. Most recorded suicides were Catholic. Of the foreigners who died by suicide in Malta, mostly were British. Larger localities naturally had more suicides, but there were localities where no suicides were recorded within the 15-year period under review. There is a statistically significant difference in the number of deaths by suicide in the region of Malta than the region of Gozo, where the number is significantly lower. In the region of Malta, the Northern Harbour showed a higher mean rate of suicide than other districts, but this is not reflected in the standardised mean rate per 100,000 inhabitants. Hanging was the method of suicide most frequently used, followed by jumping off heights and the use of firearms. Data on other factors including marital status, mental and physical health, planning and data on suicide notes were not robust due to lack of collection by the police.

Chapter 7 - Patterns and Predictors of Suicidal Methodologies in Malta

(Results Chapter 2)

Overview

This chapter is a presentation of descriptive results of data processed from police reports regarding all deaths by suicide recorded in Malta between 2003 and 2017. The interactions between different types of variables were examined. These interactions and their contribution to a pattern of suicidal methodologies in Malta is presented. Some of the variables examined, including natural variables like days, seasons and time are external to the deceased. Some other variables like psychological stressors and the effect of life events are internal to the deceased.

Results

Gender and Age

The age of 354 persons out of the total of 359 who died by suicide was recorded by the police. The youngest person reported to have died by suicide in the period under review in Malta was 14 years of age and the eldest 98 years of age. In 5 cases, the age of the person reported to have died by suicide was not available as it was not recorded in the official report by the police.

The ages of the persons who died by suicide in Malta between 2003 and 2017 were grouped and sorted by gender as recorded in Table 1. The smallest cohort was of those aged between 14 and 21 years totalling 19 recorded deaths by suicide or 5.4% of the total recorded deaths by suicide in the period under review whilst the largest cohort was of those aged between 46 and 60 years with 100 recorded suicides or 28.2 % of the total recoded deaths by suicide in Malta between 2003 and 2017.

The smallest cohort of males reported to have died by suicide in the period under review were aged between 14 and 21 years, *(N = 14)* whilst the smallest cohort of

females was of those aged over 75, *(N = 3).* The highest frequencies for both males and females were of those aged 46 to 60 *(M = 87, F = 13),* 36 to 45 *(M = 72, F = 10)*, and 22 to 35 *(M = 65, F = 8),* respectively.

Table 1.

Distribution of deaths by suicides per gender by age in Malta 2003 – 2017

	14-21	22-35	36-45	46-60	61-75	over 75	Total
Male	14	65	72	87	49	23	310
% within gender	4.5	21.0	23.2	28.1	15.8	7.4	100.0
% of total	4.0	18.4	20.3	24.6	13.8	6.5	87.6
Female	5	8	10	13	5	3	44
% within gender	11.4	18.2	22.7	29.5	11.4	6.8	100.0
% of total	1.4	2.3	2.8	3.7	1.4	0.8	12.4
Total	19	73	82	100	54	26	354
% of total	5.4	20.6	23.2	28.2	15.3	7.3	100.0

Gender and Day and Time Data

The distribution of deaths by suicide per gender reported by each calendar month is reported in Table 2. The highest number of deaths by suicide recorded between 2003 and 2017 was in March *(N = 40)* followed closely by August *(N = 39).* The month with the lowest number of recorded suicides was November *(N = 21).*

For males, the highest number of suicides *(N = 35)* was recorded in August whilst October had the lowest frequency *(N = 19).* For females, however, March had the highest frequency, *(N = 8),* followed closely by February, *(N = 6)* whilst no death by suicide was ever recorded in November in the fifteen-year period under review. This is shown in Table 2.

When the deaths by suicide are distributed by the day of the week on which the death occurred, a difference between males and females is noted. Table 3 shows that whilst the lowest frequency for males was recorded on Thursday *(N = 34),* the second highest frequency was recorded for females on the same day *(N = 10).* This follows closely the

highest female suicide frequency *(N = 11)* on Friday. The highest frequency for males was recorded on Wednesday, *(N = 52*) followed by Monday *(N = 50).*

Table 2.

Distribution of deaths by suicide by gender per month of year (2003-2017)

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Males	25	25	32	23	29	26	32	35	20	19	21	26	313
% within Gender	8.0	8.0	10.2	7.3	9.3	8.3	10.2	11.2	6.4	6.1	6.7	8.3	100.0
% of Total	7.0	7.0	8.9	6.4	8.1	7.2	8.9	9.7	5.6	5.3	5.8	7.2	87.2
Females	3	6	8	3	4	3	1	4	5	4	0	5	46
% within Gender	6.5	13.0	17.4	6.5	8.7	6.5	2.2	8.7	10.9	8.7	0.0	10.9	100.0
% of Total	0.8	1.7	2.2	0.8	1.1	0.8	0.3	1.1	1.4	1.1	0.0	1.4	12.8
Total	28	31	40	26	33	29	33	39	25	23	21	31	359
% of Total	7.8	8.6	11.1	7.2	9.2	8.1	9.2	10.9	7.0	6.4	5.8	8.6	100.0

Table 3.

Distribution of deaths by suicide by gender per day of the week (2003 – 2017)

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
Males	50	46	52	34	46	44	41	313
% within Gender	16.0	14.7	16.6	10.9	14.7	14.1	13.1	100.0
% of Total	13.9	12.8	14.5	9.5	12.8	12.3	11.4	87.2
Females	5	3	4	10	11	6	7	46
% within Gender	10.9	6.5	8.7	21.7	23.9	13.0	15.2	100.0
% of Total	1.4	0.8	1.1	2.8	3.1	1.7	1.9	12.8
Total	55	49	56	44	57	50	48	359
% of Total	15.3	13.6	15.6	12.3	15.9	13.9	13.4	100.0

Gender and Seasonality

The highest number of deaths by suicide of males in the period under review, *(N = 93)* occurred in summer (29.7% of all male deaths). In the same season, the lowest number of deaths by suicide of females *(N = 8),* was recorded (17.4% of all female deaths). The highest frequency of deaths for females was recorded in Spring *(N = 15)* followed closely by Winter *(N = 14)* whilst the lowest frequency for males was recorded in Autumn, *(N = 60)* as shown in Table 4.

Table 4.

Distribution of deaths by suicide by gender per season (2003 – 2017)

	Spring	Summer	Autumn	Winter	Total
Male	84	93	60	76	313
% within Gender	26.8	29.7	19.2	24.3	100.0
% within Total	23.4	25.9	16.7	21.2	87.2
Female	15	8	9	14	46
% within Gender	32.6	17.4	19.6	30.4	100.0
% within Total	4.2	2.2	2.5	3.9	12.8
Total	99	101	69	90	359
% of Total	27.6	28.1	19.2	25.1	100.0

Gender, Age and Time of Death

The distribution of deaths by suicide across the time of day per gender and age is presented in Table 5. This indicates that suicide in Malta occurred more frequently in the morning with 125 recorded deaths or 35.3% of the total suicides recorded by age for the period under review (N = *354*). Frequency waned throughout the day with the lowest recorded frequency during the night *(N = 54)* resulting in 15.3% of the total recorded deaths by suicide. The table also indicates that older adults have more frequently chosen to die by suicide in the morning when compared to the younger adults. It also indicates that males are more likely than females to die by suicide in the morning. For ease of reference, the day was divided into four equal segments; morning

was taken to be between 06.00 hours and 12.00 hours, afternoon taken to be between 12.00 hours and 18.00 hours, evening taken to be from 18.00 hours to midnight and the night taken to be from midnight to 06.00 hours. Where the death occurred on the hour between two segments, the death was taken to have happened in the previous segment, that is a death recorded to have happened at 06.00 was taken to have happened at night with the other segments following the same pattern.

Table 5.

Distribution of suicide per gender, time of completion and age.

Age	Gender		Morning	Afternoon	Evening	Night	Total
14 – 21	Male	Count	4	4	3	3	14
		% of Male	28.6	28.6	21.4	21.4	100.0
	Female	Count	1	1	1	2	5
		% of Female	20.0	20.0	20.0	40.0	100.0
22 – 35	Male	Count	16	22	14	13	65
		% of Male	24.6	33.8	21.5	20.0	100.0
	Female	Count	0	2	3	3	8
		% of Female	0.0	25.0	37.5	37.5	100.0
36 – 45	Male	Count	20	24	20	8	72
		% of Male	27.8	33.3	27.8	11.1	100.0
	Female	Count	3	2	2	3	10
		% of Female	30.0	20.0	20.0	30.0	100.0
46 – 60	Male	Count	37	25	14	11	87
		% of Male	42.5	28.7	16.1	12.6	100.0
	Female	Count	5	7	1	0	13
		% of Female	38.5	53.8	7.7	0.0	100.0
61 – 75	Male	Count	25	10	8	6	49
		% of Male	51.0	20.4	16.3	12.2	100.0
	Female	Count	1	1	1	2	5
		% of Female	20.0	20.0	20.0	40.0	100.0
Over 75	Male	Count	10	4	6	3	23
		% of Male	43.5	17.4	26.1	13.0	100.0
	Female	Count	3	0	0	0	3
		% of Female	100.0	0.0	0.0	0.0	100.0
Total	Male	Count	112	89	65	44	310
		% of Male	36.1	28.7	21.0	14.2	100.0
	Female	Count	13	13	8	10	44
		% of Female	29.5	29.5	18.2	22.7	100.0
	Total	Count	125	102	73	54	354
		% of Total	35.3	28.8	20.6	15.3	100.0

Gender, Age and Method of Death

The distribution of suicides by method of death per age group and gender is represented in Table 6. It is indicated that the preferred method of death for males is hanging, *(N = 165)* representing 52.6% of male-suicides followed by jumping from heights *(N = 70),* representing 22.6% of the total number of males who died by suicide in the period under review.

The preferred method of suicide for females is jumping off heights, *(N = 21)* representing 47.7% of the total number of females who died by suicide in the period under review, followed by hanging, *(N = 14)* representing 31.8% of the total number of females who have died by suicide.

All recorded suicides by carbon monoxide poisoning (*N = 9*) were males mostly within the 22 to 35 years of age bracket (*N = 5*).

Within the youngest cohort, only three methods of suicides were recorded, that is, hanging, the use of a firearm and jumping off heights. Young males between 14 and 21 years of age preferred hanging (71.4%) whereas females within the same age group preferred jumping of heights (60.0%).

Table 6.

Distribution of methods of suicide per age group and gender

Age	Gender		Hanging	Firearm	Jumping	Sub-Stance	CO Poison	Drown-ing	Self-Stabbing	Others	Total
14 - 21	Male	Count	10	3	1	0	0	0	0	0	14
		% of Male	71.4	21.4	7.1	0.0	0.0	0.0	0.0	0.0	100.0
	Female	Count	1	1	3	0	0	0	0	0	5
		% of Female	20.0	20.0	60.0	0.0	0.0	0.0	0.0	0.0	100.0
22 - 35	Male	Count	37	7	10	2	5	0	2	2	65
		% of Male	56.9	10.8	15.4	3.1	7.7	0.0	3.1	3.1	100.0
	Female	Count	4	1	1	1	0	0	0	1	8
		% of Female	50.0	12.5	12.5	12.5	0.0	0.0	0.0	12.5	100.0
36 - 45	Male	Count		13	14	2	1	1	2	1	72
		% of Male	52.8	18.1	19.4	2.8	1.4	1.4	2.8	1.4	100.0
	Female	Count	4	0	5	0	0	0	1	0	10
		% of Female	40.0	0.0	50.0	0.0	0.0	0.0	10.0	0.0	100.0
46 - 60	Male	Count		9	23	4	1	1	0	0	87
		% of Male	56.3	10.3	26.4	4.6	1.1	1.1	0.0	0.0	100.0
	Female	Count	3	0	8	0	0	2	0	0	13
		% of Female	23.1	0.0	61.5	0.0	0.0	15.4	0.0	0.0	100.0
61 - 75	Male	Count	22	5	14	1	2	2	2	1	49
		% of Male	44.9	10.2	28.6	2.0	4.1	4.1	4.1	2.0	100.0
	Female	Count	1	0	2	0	0	1	1	0	5
		% of Female	20.0	0.0	40.0	0.0	0.0	20.0	20.0	0.0	100.0
Over 75	Male	Count	7	6	8	0	0	1	0	1	23
		% of Male	30.4	26.1	34.8	0.0	0.0	4.3	0.0	4.3	100.0
	Female	Count	1	0	2	0	0	0	0	0	3
		% of Female	33.3	0.0	66.7	0.0	0.0	0.0	0.0	0.0	100.0
Total	Male	Count	163	43	70	9	9	5	6	5	310
		% of Male	52.6	13.9	22.6	2.9	2.9	1.6	1.9	1.6	100.0
	Female	Count	14	2	21	1	0	3	2	1	44
		% of Female	31.8	4.5	47.7	2.3	0.0	6.8	4.5	2.3	100.0
	Total	Count	177	45	91	10	9	8	8	6	354
		% of Total	50.0	12.7	25.7	2.8	2.5	2.3	2.3	1.7	100.0

Gender, Method and Location of Death

The choice of the place to die varied across cases but certain types of locations were more common than others. Table 7 indicates the seven most common methods of deaths and the seven most common locations were suicides occurred in Malta in the period under review. In both categories, another generic classification was added to include those cases which could not be put into the other seven classifications.

In 48.7 % of cases, suicide happened at home, making home the most common place of suicide in Malta between 2003 and 2017, *(N = 175).*

The home was the location were 148 males died by suicide. This represents 47.3% of all males who have died by suicide in Malta between 2003 and 2017, (Table 8). The home was also used by 58.7% of the total number of females *(N = 27)* who have died by suicide in Malta in the period under review, (Table 9).

A variety of methods of death were used in suicides occurring at home; in 99 cases representing 56.6% of the total number of deaths by suicide at home, hanging was used. This was followed by jumping from heights, most frequently the roof of the house*, (N = 28)* and using a firearm *(N = 27)* representing 16.0% and 15.4% of the total number of suicides at home respectively. Table 7, which shows the distribution of suicides by method of death and place where suicide occurred, indicates that the home was the only location or place of death where all of the seven most frequently used methods of suicide were used.

Similarly, the home was the nearly exclusive for persons who stabbed themselves to death. Of the 9 cases of deaths reported to have occurred by self-stabbing, 8 occurred at home with the other being committed in a similar setting, that is by a seaman is his private cabin onboard a merchant ship.

The second most common location of suicides was a private garage, *(N = 47)* representing 13.1% of the total recorded deaths by suicide in the period under review. Data if these privately-owned garages were interconnected with the home or separated from the living quarters were not available. Of these 47 deaths by suicide recorded to

have happened in a private garage, there was only one female death, (Table 9). The same location was used in 5 out of 9 cases where the method of death was Carbon Monoxide poisoning, which method of death was only used by males.

The category "Public areas" includes, public gardens, rural and agricultural areas accessible to the public and other public spaces. These were the location of 36 deaths by suicide in the period under review amounting to 10% of the total number of cases. Other locations, which may also be considered as public areas, such as bastions, cliffs and bridges amount to 8.6%, 2.5% and 2.8% of the total recorded deaths by suicide in the period under review respectively.

There were 19 deaths by suicide which were recorded to have happened in an institution. This category includes police holding cells, prisons, hospitals, respite homes and homes for the elderly. Out of the 19 persons who died by suicide in an institution, 18 employed only two methods of death; 11 by hanging and 7 by jumping with the other case being a death by self-suffocation.

A bridge was the location of ten of the suicides considered in this study. In each of the ten suicides, death was caused after the person jumped off the bridge. Two other locations were primarily used for jumping off heights, that is cliffs and bastions. In thse locations only one case of suicide by physical exhaustion and another by carbon monoxide poisoning occurred.

Table 7 also includes the generic classification "Other" where 32 deaths by suicide were recorded. These other locations could not be classified under any one of the indicated categories and include private rural rooms, private offices, government buildings, hotels, holiday homes, stores, warehouses and private construction sites.

Of the 91 cases of deaths by suicide committed by jumping off heights, 76 or 83.6% occurred in four particular settings; the most common was jumping off bastions *(N = 30),* followed by jumping off the roof, balcony or window at home *(N = 28),* jumping off bridges *(N = 10)* and jumping off cliffs *(N = 8)*. The other 41 cases of death by jumping off heights were spread across other types of places including institutions and other public or private buildings.

Table 7 shows the distribution of deaths by suicide per place of death and method of death in Malta between 2003 and 2017, whilst Table 8 shows the same distribution for males only and Table 9 shows the same distribution for females only.

Table 7.

Distribution of deaths by suicides in Malta per place and method of death between 2003 – 2017

	Home	Private Garage	Public Area	Bastions	Cliffs	Bridge	Institution	Other	Total
Hanging	99	35	19	0	0	0	11	16	180
% within Method of death	55.0	19.4	10.6	0.0	0.0	0.0	6.1	8.9	100.0
% within Place of death	56.6	74.5	52.8	0.0	0.0	0.0	57.9	50.0	50.1
Firearm	27	5	11	0	0	0	0	2	45
% within Method of death	60.0	11.1	24.4	0.0	0.0	0.0	0.0	4.4	100.0
% within Place of death	15.4	10.6	30.6	0.0	0.0	0.0	0.0	6.3	12.5
Jumping	28	0	1	30	8	10	7	7	91
% within Method of death	30.8	0.0	1.1	33.0	8.8	11.0	7.7	7.7	100.0
% within Place of death	16.0	0.0	2.8	96.8	88.9	100.0	36.8	21.9	25.3
Substance	7	1	1	0	0	0	0	2	11
% within Method of death	63.6	9.1	9.1	0.0	0.0	0.0	0.0	18.2	100.0
% within Place of death	4.0	2.1	2.8	0.0	0.0	0.0	0.0	6.3	3.1
CO Poisoning	2	5	1	1	0	0	0	0	9
% within Method of death	22.2	55.6	11.1	11.1	0.0	0.0	0.0	0.0	100.0
% within Place of death	1.1	10.6	2.8	3.2	0.0	0.0	0.0	0.0	2.5
Drowning	2	0	3	0	0	0	0	3	8
% within Method of death	25.0	0.0	37.5	0.0	0.0	0.0	0.0	37.5	100.0
% within Place of death	1.1	0.0	8.3	0.0	0.0	0.0	0.0	9.4	2.2
Self-Stabbing	8	0	0	0	0	0	0	1	9
% within Method of death	88.9	0.0	0.0	0.0	0.0	0.0	0.0	11.1	100.0
% within Place of death	4.6	0.0	0.0	0.0	0.0	0.0	0.0	3.1	2.5
Others	2	1	0	0	1	0	1	1	6
% within Method of death	33.3	16.7	0.0	0.0	16.7	0.0	16.7	16.7	100.0
% within Place of death	1.1	2.1	0.0	0.0	11.1	0.0	5.3	3.1	1.7
Total	175	47	36	31	9	10	19	32	359
% within Method of death	48.7	13.1	10.0	8.6	2.5	2.8	5.3	8.9	100.0

Table 8.

Distribution of deaths by suicides in Malta by males per place and method of death between 2003 -2017

	Home	Private Garage	Public Area	Bastions	Cliffs	Bridge	Institution	Other	Total
Hanging	85	34	19	0	0	0	11	16	165
% within Method of death	51.5	20.6	11.5	0.0	0.0	0.0	6.7	9.7	100.0
% within Place of death	57.4	73.9	54.3	0.0	0.0	0.0	61.1	59.3	52.7
Firearm	25	5	11	0	0	0	0	2	43
% within Method of death	58.1	11.6	25.6	0.0	0.0	0.0	0.0	4.7	100.0
% within Place of death	16.9	10.9	31.4	0.0	0.0	0.0	0.0	7.4	13.7
Jumping	20	0	1	25	6	6	6	6	70
% within Method of death	28.6	0.0	1.4	35.7	8.6	8.6	8.6	8.6	100.0
% within Place of death	13.5	0.0	2.9	96.2	85.7	100.0	33.3	22.2	22.4
Substance	6	1	1	0	0	0	0	1	9
% within Method of death	66.7	11.1	11.1	0.0	0.0	0.0	0.0	11.1	100.0
% within Place of death	4.1	2.2	2.9	0.0	0.0	0.0	0.0	3.7	2.9
CO Poisoning	2	5	1	1	0	0	0	0	9
% within Method of death	22.2	55.6	11.1	11.1	0.0	0.0	0.0	0.0	100.0
% within Place of death	1.4	10.9	2.9	3.8	0.0	0.0	0.0	0.0	2.9
Drowning	2	0	2	0	0	0	0	1	5
% within Method of death	40.0	0.0	40.0	0.0	0.0	0.0	0.0	20.0	100.0
% within Place of death	1.4	0.0	5.7	0.0	0.0	0.0	0.0	3.7	1.6
Self-Stabbing	6	0	0	0	0	0	0	1	7
% within Method of death	85.7	0.0	0.0	0.0	0.0	0.0	0.0	14.3	100.0
% within Place of death	4.1	0.0	0.0	0.0	0.0	0.0	0.0	3.7	2.2
Others	2	1	0	0	1	0	1	0	5
% within Method of death	40.0	20.0	0.0	0.0	20.0	0.0	20.0	0.0	100.0
% within Place of death	1.4	2.2	0.0	0.0	14.3	0.0	5.6	0.0	1.6
Total	148	46	35	26	7	6	18	27	313
% within Method of death	47.3	14.7	11.2	8.3	2.2	1.9	5.8	8.6	100.0

Table 9.

Distribution of deaths by suicides in Malta by females per place and method of death between 2003 – 2017

	Home	Private Garage	Public Area	Bastions	Cliffs	Bridge	Institution	Other	Total
Hanging	14	1	0	0	0	0	0	0	15
% within Method of death	93.3	6.7	0.0	0.0	0.0	0.0	0.0	0.0	100.0
% within Place of death	51.9	100.0	0.0	0.0	0.0	0.0	0.0	0.0	32.6
Firearm	2	0	0	0	0	0	0	0	2
% within Method of death	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
% within Place of death	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3
Jumping	8	0	0	5	2	4	1	1	21
% within Method of death	38.1	0.0	0.0	23.8	9.5	19.0	4.8	4.8	100.0
% within Place of death	29.6	0.0	0.0	100.0	100.0	100.0	100.0	20.0	45.7
Substance	1	0	0	0	0	0	0	1	2
% within Method of death	50.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	100.0
% within Place of death	3.7	0.0	0.0	0.0	0.0	0.0	0.0	20.0	4.3
Drowning	0	0	1	0	0	0	0	2	3
% within Method of death	0.0	0.0	33.3	0.0	0.0	0.0	0.0	66.7	100.0
% within Place of death	0.0	0.0	100.0	0.0	0.0	0.0	0.0	40.0	6.5
Self-Stabbing	2	0	0	0	0	0	0	0	2
% within Method of death	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
% within Place of death	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3
Others	0	0	0	0	0	0	0	1	1
% within Method of death	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0
% within Place of death	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	2.2
Total	27	1	1	5	2	4	1	5	46
% within Method of death	58.7	2.2	2.2	10.9	4.3	8.7	2.2	10.9	100.0

Residence and Gender

The distribution of deaths by suicide per gender by the deceased's district of residence is shown in Table 10. It is noted that the category Non-Residents and the South Eastern districts had the highest percentage of male deaths by suicide at 92.3% and 91.8% respectively whereas Gozo and Commino had the highest percentage of female deaths by suicide at 25%. The most pronounced gender difference resulted in non-residents where 92.3%, *(N = 12)* were male and 7.7%, *(N = 1)* were female resulting in a gender difference of 84.6%. This was closely followed by the South Eastern district where an 83.6% difference between genders was recorded. (91.8%, *[n=56]* of the persons who died by suicide in the district were males compared to the 8.2 % *[n=5]* who were females). The lowest gender difference was noted in Gozo and Comino where 75% of suicides were males *(N = 6)* and 25% females *(N = 2)* resulting in a difference of 50%.

Table 10.

Distribution of deaths by suicide in Malta between 2003 and 2017 per gender and district of residence of deceased

	Northern Harbour	Southern Harbour	South Eastern	Western	Northern	Gozo & Comino	Non-Resident	Total
Male	66	87	56	34	52	6	12	313
% within DOR*	86.8	84.5	91.8	85.0	89.7	75.0	92.3	87.2
Female	10	16	5	6	6	2	1	46
% within DOR	13.2	15.5	8.2	15.0	10.3	25.0	7.7	12.8
Total	76	103	61	40	58	8	13	359
% within total	21.2	28.7	17.0	11.1	16.2	2.2	3.6	100

*District of Residence

Residence and Method of Death

The method of death varies in its occurrence in the different districts of the islands. Table 11 demonstrates the distribution of death by suicide per method of death across the different districts. It is noted that during the fifteen-year period under review, in the district of Gozo and Comino, only the three most frequently used methods of suicides were recorded, that is death by hanging, by using a firearm and by jumping off heights.

A higher percentage of firearm suicides is noted in the district of Gozo and Comino *(N = 2)* representing 25% and in the South Eastern district *(N = 15)* representing 24.6% of the total number of suicides in Malta in the period under review.

The distribution of methods of death employed in the Southern Harbour district is different form the other districts; whilst it has the lowest percentage of suicides by hanging, that is 36.9% of the total number of suicides within each district, it has the highest percentage, (34.0%) of suicides committed by jumping off heights. The district also has the highest frequency and thus percentage of suicides committed by carbon monoxide poisoning, *(N = 5)*.

On another note, the Northern Harbour district shows the highest percentage of deaths by hanging (63.2%) but the lowest percentage of firearm suicides (5.3%) when excluding non-residents (none of who died by using a firearm).

Table 11.

Distribution of suicides by method of death per district of residence

	Hanging	Firearm	Jumping	Substance	CO Poison	Drowning	Self-Stabbing	Others	Total
Northern Harbour	48	4	20	0	1	1	1	1	76
% within DOR*	63.2	5.3	26.3	0.0	1.3	1.3	1.3	1.3	100.0
Southern Harbour	38	14	35	4	5	2	3	2	103
% within DOR	36.9	13.6	34.0	3.9	4.9	1.9	2.9	1.9	100.0
South Eastern	36	15	8	0	0	2	0	0	61
% within DOR	59.0	24.6	13.1	0.0	0.0	3.3	0.0	0.0	100.0
Western	20	4	10	2	1	0	2	1	40
% within DOR	50.0	10.0	25.0	5.0	2.5	0.0	5.0	2.5	100.0
Northern	26	6	14	4	2	2	2	2	58
% within DOR	44.8	10.3	24.1	6.9	3.4	3.4	3.4	3.4	100.0
Gozo & Comino	5	2	1	0	0	0	0	0	8
% within DOR	62.5	25.0	12.5	0.0	0.0	0.0	0.0	0.0	100.0
Non-Resident	7	0	3	1	0	1	1	0	13
% within DOR	53.8	0.0	23.1	7.7	0.0	7.7	7.7	0.0	100.0
Total	180	45	91	11	9	8	9	6	359
% of total	50.1	12.5	25.3	3.1	2.5	2.2	2.5	1.7	100.0

*DOR = District of Residence

Method of Death and Age.

The distribution of deaths by suicide per method of death by age group is shown in Table 12. The method of hanging is the most commonly used in all age cohorts. Drowning was used as the method of death mostly by persons between 48 and 70 (N = 6) with one case where the deceased was aged 36 and other aged 90. The preferred methods of death of the youngest cohort, that is those aged 14 to 21 years were three of the more frequently used methods; that is, hanging, jumping off heights and by using a firearm. In all 19 cases within the age group, the method of death was one of these indicated three.

Table 12.

Distribution of deaths by suicide in Malta between 2003 and 2017 by method of death and age

	Hanging	Firearm	Jumping	Substance	CO Poison	Drowning	Self-Stabbing	Others	Total
14-21 years	11	4	4	0	0	0	0	0	19
% within cohort	57.9	21.1	21.1	0.0	0.0	0.0	0.0	0.0	100.0
22-35 years	41	8	11	3	5	0	2	3	73
% within cohort	56.2	11.0	15.1	4.1	6.8	0.0	2.7	4.1	100.0
36-45	42	13	19	2	1	1	3	1	82
% within cohort	51.2	15.9	23.2	2.4	1.2	1.2	3.7	1.2	100.0
46-60	52	9	31	4	1	3	0	0	100
% within cohort	52.0	9.0	31.0	4.0	1.0	3.0	0.0	0.0	100.0
61-75	23	5	16	1	2	3	3	1	54
% within cohort	42.6	9.3	29.6	1.9	3.7	5.6	5.6	1.9	100.0
Over 75	8	6	10	0	0	1	0	1	26
% within cohort	30.8	23.1	38.5	0.0	0.0	3.8	0.0	3.8	100.0
Total	177	45	91	10	9	8	8	6	354
% of total	50.0	12.7	25.7	2.8	2.5	2.3	2.3	1.7	100.0

Method and Day of Death

The distribution of suicide by method of death per day of the week on which the death was recorded is shown in Table13. An even distribution in the methods of death used across the days of the week is noted. However, with regards to jumping from heights, an average of 11.5 deaths was noted in every other day of the week except on Wednesday when 22 deaths occurred representing a mid-week spike of 24.2 % when compared to the average of 12.6% on all the other days.

It is also noted, that none of the nine reported cases of death by stabbing oneself occurred on weekdays, with three deaths occurring on Fridays, two on Saturdays and four on Sundays.

Table 13.

Distribution of suicide by method of death per day of the week.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
Hanging	31	27	23	23	35	21	20	180
% within method	17.2	15.0	12.8	12.8	19.4	11.7	11.1	100.0
Firearm	6	6	8	4	6	7	8	45
% within method	13.3	13.3	17.8	8.9	13.3	15.6	17.8	100.0
Jumping	10	11	22	12	11	12	13	91
% within method	11.0	12.1	24.2	13.2	12.1	13.2	14.3	100.0
Substance	3	2	0	2	1	3	0	11
% within method	27.3	18.2	0.0	18.2	9.1	27.3	0.0	100.0
CO Poisoning	3	1	1	2	0	2	0	9
% within method	33.3	11.1	11.1	22.2	0.0	22.2	0.0	100.0
Drowning	0	2	1	1	1	1	2	8
% within method	0.0	25.0	12.5	12.5	12.5	12.5	25.0	100.0
Self-Stabbing	0	0	0	0	3	2	4	9
% within method	0.0	0.0	0.0	0.0	33.3	22.2	44.4	100.0
Others	2	0	1	0	0	2	1	6
% within method	33.3	0.0	16.7	0.0	0.0	33.3	16.7	100.0
Total	55	49	56	44	57	50	48	359
% within Total	15.3	13.6	15.6	12.3	15.9	13.9	13.4	100.0

Residence and Location of Death

Table 14 shows the distribution of deaths by suicide according to the type of place where death occurred in each of the six local districts. It is worth noting that all of the ten cases of suicides recorded to have happened by jumping off a bridge happened over the same bridge in Mosta. Six of the ten persons who died by suicide by jumping off the Wied il-Ghasel bridge in Mosta resided in the Northern district where Mosta is situated.

Table 14.

Distribution of suicides by type of place where suicide was committed per district of residence

	Home	Garage	Public Area	Bastions	Cliffs	Bridge	Institu-tion	Other	Total
Northern Harbour	35	8	8	9	1	0	8	7	76
% within district	46.1	10.5	10.5	11.8	1.3	0.0	10.5	9.2	100.0
Southern Harbour	46	12	14	14	0	2	5	10	103
% within district	44.7	11.7	13.6	13.6	0.0	1.9	4.9	9.7	100.0
South Eastern	40	10	4	1	2	1	2	1	61
% within district	65.6	16.4	6.6	1.6	3.3	1.6	3.3	1.6	100.0
Northern Harbour	21	5	1	3	3	1	2	4	40
% within district	52.5	12.5	2.5	7.5	7.5	2.5	5.0	10.0	100.0
Northern	28	11	5	2	2	6	2	2	58
% within district	48.3	19.0	8.6	3.4	3.4	10.3	3.4	3.4	100.0
Gozo & Comino	5	0	1	1	0	0	0	1	8
% within district	62.5	0.0	12.5	12.5	0.0	0.0	0.0	12.5	100.0
Non-Resident	0	1	3	1	1	0	0	7	13
% Non-Resident	0.0	7.7	23.1	7.7	7.7	0.0	0.0	53.8	100.0
Total	175	47	36	31	9	10	19	32	359
% of Total	48.7	13.1	10.0	8.6	2.5	2.8	5.3	8.9	100.0

The percentage of persons who died by suicide at home is higher than the average in the South Eastern district and in Gozo and Comino with 65.6% and 62.5% of the total number of suicides per district.

Location and Time of Death

The distribution of suicide by the type of place where death occurred per time of death is shown in Table 15. The number of deaths by suicide at home decreases progressively from its highest frequency in the morning *(N = 59)* representing 33.7%

of deaths which happened at home to its lowest frequency during the night *(N = 31)* representing 17.7% of deaths which occurred at home. The classification of the time of day was the same as explained earlier in this chapter. A similar pattern is noted for deaths which happened in public areas, at bastions and cliffs.

The pattern is different for deaths which occurred in a private garage where it peaks in the afternoon *(N = 18)* and is at its lowest in the morning *(N = 8).* Deaths over bridges, which, as noted before, only occurred in a single location and a single method of death; that is jumping off heights, was distributed evenly between mornings and afternoons only. Occurrences of deaths in institutions showed a different pattern as there is an even distribution of 31.6 % of deaths occurring in the morning and in the evening with a lower percentage of deaths occurring within the same place in the afternoon (15.8%) and at night (21.1%). Occurrences in other places which included offices and private rural rooms showed more or less the same pattern as those deaths which occurred in institutions, with half the deaths occuring in the morning and a quarter occurring in the evening. The other remaining quarter was distributed evenly between afternoons and at night.

There were 16 persons who died by jumping off bastions in the morning in the period under review. Of these, 12 or 40.0% of the total number of persons who jumped off bastions, did so between 05.45 hours and 09.00 hours.

The distribution of time in the cases where persons jumped off a bridge is equal in both the morning and the afternoon (N = 5). However, further analyses of the exact time of suicide reveals that whereas the distribution is across all the time in the morning, all 5 suicides in the afternoon happened in nearly two hours between 12.45 hours and 14.30 hours.

Table 15.

Distribution of deaths by suicide by type of place where death occurred per time of day

	Home	Garage	Public Area	Bastions	Cliffs	Bridge	Institution	Other	Total
Morning	59	8	13	16	4	5	6	16	127
% within Morning	46.5	6.3	10.2	12.6	3.1	3.9	4.7	12.6	100.0
% within POD*	33.7	17.0	36.1	51.6	44.4	50.0	31.6	50.0	35.4
Afternoon	49	18	13	8	2	5	3	4	102
% within Afternoon	48.0	17.6	12.7	7.8	2.0	4.9	2.9	3.9	100.0
% within POD	28.0	38.3	36.1	25.8	22.2	50.0	15.8	12.5	28.4
Evening	36	12	7	4	2	0	6	8	75
% within Evening	48.0	16.0	9.3	5.3	2.7	0.0	8.0	10.7	100.0
% within POD	20.6	25.5	19.4	12.9	22.2	0.0	31.6	25.0	20.9
Night	31	9	3	3	1	0	4	4	55
% within Night	56.4	16.4	5.5	5.5	1.8	0.0	7.3	7.3	100.0
% within POD	17.7	19.1	8.3	9.7	11.1	0.0	21.1	12.5	15.3
Total	175	47	36	31	9	10	19	32	359
% within Total	48.7	13.1	10.0	8.6	2.5	2.8	5.3	8.9	100.0

*POD – Place of Death

District of Residence and Age

The distribution of deaths by suicide in each of the six districts together with the number of deaths by suicide of non-residents is exhibited in Table 16. Seven persons aged 14 to 21 years committed suicide in the Northern Harbour district. This represented 36.8% of the total deaths within that age group and was the highest of all the other districts, followed by the South Eastern district in which six deaths were recorded representing 31.6% of deaths by suicide within the same age group.

The highest percentage of deaths by suicide within the other age groups was consistently found to be in the Southern Harbour except for the oldest age group of those over 75 years for which the highest percentage of deaths by suicide was found to be in the Western district.

Table 16.

Distribution of deaths by suicide by district of residence per age group

	Northern Harbour	Southern Harbour	South Eastern	Western	Northern	Gozo & Comino	Non-Resident	Total
14 – 21 years	7	1	6	2	3	0	0	19
% within age group	36.8	5.3	31.6	10.5	15.8	0.0	0.0	100.0
22 – 35 years	18	22	9	9	11	2	2	73
% within age group	24.7	30.1	12.3	12.3	15.1	2.7	2.7	100.0
36 – 45 years	14	22	14	9	14	4	5	82
% within age group	17.1	26.8	17.1	11.0	17.1	4.9	6.1	100.0
46 – 60 years	20	33	17	9	18	0	3	100
% within age group	20.0	33.0	17.0	9.0	18.0	0.0	3.0	100.0
61 – 75 years	11	17	11	5	7	1	2	54
% within age group	20.4	31.5	20.4	9.3	13.0	1.9	3.7	100.0
Over 75 years	5	5	4	6	5	1	0	26
% within age group	19.2	19.2	15.4	23.1	19.2	3.8	0.0	100.0
Total	75	100	61	40	58	8	12	354
% within total	21.2	28.2	17.2	11.3	16.4	2.3	3.4	100.0

Time of Death and Age

Table 17 shows the distribution of suicides by age per time of death. It shows that there was a nearly equal distribution of deaths of persons aged 14 to 21 years across the four segments of the day. A slightly higher frequency of deaths is noted in the afternoon for persons aged 22 to 35 and 36 to 45 years with 32.9% and 41.7% respectively.

There is, however, a distinctively higher frequency of suicides in the morning for the remaining cohorts of persons aged 46 and over. There is a sharper distinction for the age group of persons over 75 years of age where 50%, *(N = 13)* of the persons in that age group having died by suicide in the morning. The lowest frequency of suicides in the same age group was at night *(N = 3)* which represents 11.5% of deaths within the age group.

Table 17.

Distribution of suicides by age per time of day of death

	Morning	Afternoon	Evening	Night	Total
14 to 21 years	5	5	4	5	19
% within age group	26.3	26.3	21.1	26.3	100.0
22 – 35 years	16	24	17	16	73
% within age group	21.9	32.9	23.3	21.9	100.0
36 – 45 years	23	26	22	11	82
% within age group	28.0	31.7	26.8	13.4	100.0
46 – 60 years	42	32	15	11	100
% within age group	42.0	32.0	15.0	11.0	100.0
61 – 75 years	26	11	9	8	54
% within age group	48.1	20.4	16.7	14.8	100.0
Over 75 years	13	4	6	3	26
% within age group	50.0	15.4	23.1	11.5	100.0
Total	125	102	73	54	354
% within Total	35.3	28.8	20.6	15.3	100.0

Day and Time of Death

The distribution of suicides by time of death and day of death is shown at Table 18. An even distribution of deaths is noted across the four segments of the day during the weekend, that is Saturday and Sunday. A similar distributional pattern is noted for the days Monday, Thursday and Friday with a slightly higher frequency during mornings and afternoons and a lower frequency at night. However, there is a distinctive spike in the frequency of deaths recorded on Tuesday mornings *(N = 29)* meaning that 59.2% of deaths which occurred on Tuesday were committed during the morning. On the other hand, Table 17 indicates that all-time low percentage of suicides was committed on Wednesday nights (N = 3) representing 5.4% of the total deaths by suicide recorded to have happened on Wednesday.

Table 18.

Distribution of suicides by time of death per day of death

	Morning	Afternoon	Evening	Night	Total
Monday	16	19	12	8	55
% within day	29.1	34.5	21.8	14.5	100.0
Tuesday	29	5	10	5	49
% within day	59.2	10.2	20.4	10.2	100.0
Wednesday	22	21	10	3	56
% within day	39.3	37.5	17.9	5.4	100.0
Thursday	12	14	8	10	44
% within day	27.3	31.8	18.2	22.7	100.0
Friday	21	15	12	9	57
% within day	36.8	26.3	21.1	15.8	100.0
Saturday	13	13	14	10	50
% within day	26.0	26.0	28.0	20.0	100.0
Sunday	14	15	9	10	48
% within day	29.2	31.3	18.8	20.8	100.0
Total	127	102	75	55	359
% of total	35.4	28.4	20.9	15.3	100.0

Method of Death and Seasons

Table 19 is a representation of the distribution of deaths by suicide per season. Whilst there was a fair distribution of deaths across the seasons for most of the methods of death, a higher distribution of deaths by consuming substances and by carbon monoxide inhalation were recorded in summer with 54.5% and 55.6% of deaths respectively.

Table 19.

Distribution of suicides by method of death per season

	Hanging	Firearm	Jumping	Substance	CO Poison	Drowning	Self-Stabbing	Others	Total
Spring	46	15	28	2	0	3	3	2	99
% within SOD*	46.5	15.2	28.3	2.0	0.0	3.0	3.0	2.0	100.0
% within MOD **	25.6	33.3	30.8	18.2	0.0	37.5	33.3	33.3	27.6
Summer	51	12	21	6	5	2	1	3	101
% within SOD	50.5	11.9	20.8	5.9	5.0	2.0	1.0	3.0	100.0
% within MOD	28.3	26.7	23.1	54.5	55.6	25.0	11.1	50.0	28.1
Autumn	35	8	18	1	2	1	3	1	69
% within SOD	50.7	11.6	26.1	1.4	2.9	1.4	4.3	1.4	100.0
% within MOD	19.4	17.8	19.8	9.1	22.2	12.5	33.3	16.7	19.2
Winter	48	10	24	2	2	2	2	0	90
% within SOD	53.3	11.1	26.7	2.2	2.2	2.2	2.2	0.0	100.0
% within MOD	26.7	22.2	26.4	18.2	22.2	25.0	22.2	0.0	25.1
Total	180	45	91	11	9	8	9	6	359
% within SOD	50.1	12.5	25.3	3.1	2.5	2.2	2.5	1.7	100.0

*SOD – Season of Death
*MOD – Method of Death

The Shapiro Wilk test was used to determine whether age distribution is normal or skewed. The results of the S-W test suggested the data were not normally distributed, W (df =354) = .98, p < .001. This indicactes that the age distribution is skewed as it does not satisfy the normality assumption. For this reason, non-parametric tests will be used to analyse the collected data.

The Kruskal Wallis test was used to compare the mean age of persons using different methods of suicide. The null hypothesis specifies that the mean age varies marginally between classifications and is accepted if the p - value exceeds the 0.05 level of significance. In contrast the alternative hypothesis specifies that mean age varies significantly across classifications and is accepted if the p - value is less than 0.05. The Kruskal-Wallis test indicate that there is a significant difference in the medians, ($\chi 2(7) = 14.28$, $p = 0.046$)

Table 20 indicates that the mean age of persons who died by drowning is the highest at 62.38 years, (SD=16.35) indicating that this method is predominantly used by older adults. This is followed by jumping, other methods of suicide, self-stabbing, firearm use, hanging, substance use and carbon monoxide poisoning. The mean age of persons who died by carbon monoxide poisoning was 41 years, (SD=14.31) indicating that this method of suicide was predominantly used by younger adults. The difference between the method of suicide showing the youngest mean age (CO poisoning) and the method with the eldest mean age (drowning) was 21.38 years.

Table 20.

Kruskal Wallis test of age per method of suicide

Suicide method	N	Mean Age	Std. Deviation
Hanging	177	45.64	16.17
Firearm	45	46.78	20.17
Jumping	91	51.58	17.67
Substance	10	44.50	14.23
CO Poisoning	9	41.00	14.31
Drowning	8	62.38	16.35
Self-Stabbing	8	47.13	14.77
Others	6	48.17	29.88

$H(7) = 14.28$, $p = 0.046$

A Post-hoc Mann-Whitney test using a Bonferroni adjusted alpha level of 0.00178 (0.05/28) was employed to calculate pairwise comparisons. None of the pairwise comparison reached statistical significance as none returned a p - value smaller than the adjusted alpha level. Table 21 shows all the pairwise comparisions of the methods of suicide.

Table 21.

Pairwise comparisons of the method of suicide (Post Hoc Test)

	Test Statistic	Std. Error	Std. Test Statistic	P-value
CO Poisoning-Others	-15.08	53.93	-0.28	.780
CO Poisoning-Substance	25.12	47.01	0.53	.593
CO Poisoning-Hanging	29.47	34.96	0.84	.399
CO Poisoning-Firearm	31.61	37.36	0.85	.397
CO Poisoning-Self-Stabbing	-38.98	49.72	-0.78	.433
CO Poisoning-Jumping	63.21	35.75	1.77	.077
CO Poisoning-Drowning	-124.73	49.72	-2.51	.012
Others-Substance	10.03	52.84	0.19	.849
Others-Hanging	14.39	42.47	0.34	.735
Others-Firearm	16.53	44.47	0.37	.710
Others-Self-Stabbing	23.90	55.26	0.43	.665
Others-Jumping	48.12	43.13	1.12	.264
Others-Drowning	109.65	55.26	1.98	.047
Substance-Hanging	4.36	33.26	0.13	.896
Substance-Firearm	6.49	35.77	0.18	.856
Substance-Self-Stabbing	-13.86	48.53	-0.29	.775
Substance-Jumping	38.09	34.09	1.12	.264
Substance-Drowning	-99.61	48.53	-2.05	.040
Hanging-Firearm	-2.14	17.08	-0.13	.900
Hanging-Self-Stabbing	-9.51	36.98	-0.26	.797
Hanging-Jumping	-33.73	13.20	-2.56	.011
Hanging-Drowning	-95.26	36.98	-2.58	.010
Firearm-Self-Stabbing	-7.37	39.26	-0.19	.851
Firearm-Jumping	-31.59	18.65	-1.69	.090
Firearm-Drowning	-93.12	39.26	-2.37	.018
Self-Stabbing-Jumping	24.23	37.73	0.64	.521
Self-Stabbing-Drowning	85.75	51.16	1.68	.094
Jumping-Drowning	-61.52	37.73	-1.63	.103

In order to ascertain whether males and females age differed depending on the method of suicide, stratified Kruskal-Wallis analyses were conducted for both genders separetely. A *p* - value greater than 0.05 was returned therefore indicating that age did not affect the choice of method of suicide in both males and females. This may be due to low sample size on some of the methods. However, the results in Table 22, indicate that that the mean age of females who died by firearms was lower at 21.5 years (SD=9.19)

when compared to males (47.95 years, SD=19.81), although the fact that only two cases were presented has to be taken into account. Males who chose jumping as their method of death were on average more than 5 years older than females whilst males who chose hanging had a mean age of 45.93 years (SD=16.17) representing more than 3 years of age difference over females who had a mean age of 42.29 (SD=16.41). Other differences in the mean age of persons dying by other methods of suicide were noted but since the sample size is quite low, these do not merit to be commented upon. The mean age of both males and females who resorted to drowning as a method of suicide (having a comparable number of cases at 5 males and 3 females) was nearly identical at a mean age of 62.60 years for males and 62.00 for females.

Table 22.

Kruskal Wallis test for age per method of suicide by gender

Gender	Suicide method	N	Mean age	Std. deviation
Male*	Hanging	163	45.93	16.17
	Firearm	43	47.95	19.81
	Jumping	70	52.84	17.69
	Substance	9	45.78	14.47
	CO Poisoning	9	41.00	14.31
	Drowning	5	62.60	21.02
	Self-Stabbing	6	46.67	15.55
	Others	5	52.60	31.12
Female**	Hanging	14	42.29	16.41
	Firearm	2	21.50	9.19
	Jumping	21	47.38	17.35
	Substance	1	33.00	.
	CO Poisoning	.	.	.
	Drowning	3	62.00	7.21
	Self-Stabbing	2	48.50	17.68
	Others	1	26.00	.

*H(7) = 11.03, p = 0.137
**H(6) = 10.26, p = 0.114

The Kruskal Wallis test was also utilised to compare the mean age of persons choosing different locations of suicide. The null hypothesis specifies that the mean age varies marginally between different locations and is accepted if the p - value exceeds the 0.05

level of significance. The alternative hypothesis specifies that mean ages vary significantly between locations and is accepted if the *p* - value is less than 0.05.
The Kruskal-Wallis test indicate that there is no significant difference in the medians as the *p* - value is greater than the 0.05 threshold of significance, ($\chi 2(7) = 5.18$, $p = 0.639$)

Table 23 indicates that the mean age of persons choosing to die in a private garage was the lowest at 44.15 years (SD=17.90) whilst the mean age of those dying in an institution was the highest at 54.63 years (SD=23.35). The mean difference between the youngest cohort (private garage) and the eldest (institution) is 10.48 years.

Table 23.

Kruskal Wallis test for age per place of suicide

Place of suicide	Sample size	Mean age	Std. deviation
Home	173	47.69	17.90
Private Garage	47	44.15	13.56
Public Area	36	46.78	20.48
Bastions	31	48.84	14.31
Cliffs	9	46.44	17.31
Bridge	10	53.30	12.83
Institution	19	54.63	23.35
Other	29	46.31	16.61

$H(7) = 5.18$, $p = 0.639$

In order to determine if age had an effect on males and females with regards to their choice of location of suicide, stratified Kruskal-Wallis analyses were conducted for both genders separetely. A *p* - value of 0.536 was returned for males and 0.401 for females. As both are greater than the 0.05 mark of significance, one can denote that age did not affect the preference of a location of death in any one gender. This may be due to low sample size particularly in the female cohort. The low sample size does not allow for any annotation on certain locations of death particularly where the sample size is just 1. However, the results in Table 24, indicate that that the mean age of females who died by suicide at home was 5.48 years lower (43.04 years, SD=17.78) than males (48.52 years, SD=17.85).

Table 24.

Kruskal Wallis test for age per place of suicide by gender

Gender	Place of suicide	N	Mean age	Std. deviation
Male*	Home	147	48.52	17.85
	Private Garage	46	44.50	13.50
	Public Area	35	46.40	20.65
	Bastions	26	50.23	14.29
	Cliffs	7	41.14	13.98
	Bridge	6	52.50	16.27
	Institution	18	55.61	23.62
	Other	25	46.84	15.76
Female**	Home	26	43.04	17.78
	Private Garage	1	28.00	.
	Public Area	1	60.00	.
	Bastions	5	41.60	13.48
	Cliffs	2	65.00	18.36
	Bridge	4	54.50	7.05
	Institution	1	37.00	.
	Other	4	43.00	23.92

*H(7) = 6.03, p = 0.536

**H(7) = 7.27, p = 0.401

Multinomial Logistic Regression with Method of Death, Gender and Age

A Multinomial Logistic Regression was used to analyse predictors for an unordered group classification, methods of suicide including hanging, firearm use, jumping and 'all other methods'. The category 'all other methods' included substance use, CO poisoning, drowning, self-stabbing and other methods which could be included in the other classifications. These all had low frequencies and thus were collapsed into one category for the purposes of inferential statistical analysis. Of the 359 recorded cases of suicide, 5 were discarded as 'age' was not recorded. The reference category for the outcome variable was 'hanging' as this had the highest frequency (*N=177*); each of the other three categories was compared to this reference group. The main interest of the current analysis was focused on the relationship between age, gender and method of suicide, as these were the variables most frequently recorded.

Whenever the 95% confidence interval of the odds ratio is a value of 1 or more, it indicates that the odds ratio is not significant and so the p-value should exceed the 0.05 level of significance. Conversely, when the 95% confidence interval of the odds ratio is less than 1, it indicates that this odd ratio is significant and that the p-value should be significant or less than 0.05.

The model fit is significant $\chi^2(6) = 24.5$, $p < .001$ which indicates that the full model predicts significantly better, or more accurately, than the null model.

The goodness of fit which provides further evidence of good fit returned a *p* - value of 0.072 and 0.427 on the Pearson and Deviance statistics respectively. The lack of significance indicated by *p* - values greater than the 0.05 level of significance indicates a good fit.

Table 25 indicates that age and gender do not have a significant effect when the category "firearms" is compared to the reference category "hanging". However, when "jumping" is compared to "hanging" it is noted that suicide by jumping increases 2% for every year increase in the age of the deceased. Females are 3.85 times more likely to suicide by jumping when compared to hanging. Conversely, males are 3.85 times more likely to use hanging as their method of death when compared to jumping.

When the combined category "other methods" was compared to "hanging" as a reference category, no significant difference according to age or gender were noted.

Table 25.

Multinomial logistic regression of age and gender vs method of suicide with hanging as a reference group

Method		B	St. Error	Wald	df	*p* - value	Odds Ratio	95% CI for Odds Ratio Lower Bound	95% CI for Odds Ratio Upper Bound
Firearm	Intercept	-2.09	.86	5.87	1	.015			
	Age	.00	.01	.12	1	.729	1.00	.98	1.02
	Male *(n=43)*	.60	.78	.59	1	.442	1.82	.40	8.33
	Female *(n=2)*	0	.	.	0	.	.	.	.
Jumping	Intercept	-.57	.49	1.40	1	.237			
	Age	.02	.00	8.35	1	.004	1.02	1.00	1.04
	Male *(n=70)*	-1.36	.38	12.68	1	.000	.26	.12	.54
	Female *(n=21)*	0	.	.	0	.	.	.	.
All other	Intercept	-1.14	.64	3.19	1	.074			
methods	Age	.01	.01	.07	1	.300	1.01	.99	1.03
	Male *(n=34)*	-.92	.50	3.37	1	.066	.40	.15	1.07
	Female *(n=7)*	0	.	.	0	.	.	.	.

Note: Reference group: Hanging *(n* = 177*),* CI = Confidence Interval

Multinomial Logistic Regression with Place of Death, Gender and Age

A Multinomial Logistic Regression was used to analyse the relationship between the place of death, gender and age. The reference category for the outcome variable was the classification 'home' as this had the highest frequency (*N=173*). Each of the other seven categories was compared to this reference group. Of the 359 recorded cases of suicide, 5 were discarded as 'age' was not recorded.

As recorded in the previous multinomial logic regression with the method of suicide, where the 95% confidence interval of the odds ratio is a value of 1 or more, the odds ratio is deemed as not significant and so the p-value should exceed the 0.05 level of significance. Conversely, when the 95% confidence interval of the odds ratio is less than 1, it indicates that this odd ratio is significant and that the p-value should be significant or less than 0.05.

The model fit is significant $\chi^2(14) = 26.15$, $p = 0.025$ which indicates that the full model predicts significantly better, or more accurately, then the null model.

The goodness of fit, which provides further evidence of good fit, returned a *p*-value of 0.466 and 1.000 on the Pearson and Deviance statistics respectively. The lack of significance indicated by *p*-values greater than the 0.05 level of significance indicates a good fit.

Table 26 indicates that when the category "private garage" is compared to the reference category "home", males are 8.6 times more likely than females to choose a private garage as the location of suicide. Conversely, females are 8.6 times more likely to suicide at home than males when this is compared to suicide in private garages. The odds ratio (OR = 8.6) is significant since the *p* – value (0.038) is less than the 0.05 level of significance.

Data from the same table shows that males are 6.31 times more likely than females to die by suicide in a public area when this is compared to the reference location "home". Conversely females are 6.31 times more likely than males to suicide at home when compared to suicides in public area. The odds ratio (OR = 6.31) is almost significant since the *p* - value (0.076) exceeds the 0.05 level of significance by a very small margin.

Table 26 indicates that that when the location "bridge" is compared to the reference category "home", females are 4.17 times more likely than men to use the "bridge" as the location of suicide. Conversely males are 4.17 times more likely than females to suicide at home when this is compared to the category "bridge". The odds ratio (OR = 4.17) is significant since the *p* – value (0.039) is less than the 0.05 level of significance.

Table 26.

Multinomial logistic regression of age and gender vs place of suicide with home as a reference group

Place		B	Std. Error	Wald	df	*p* - value	Odds Ratio	95% CI for Odds Ratio Lower Bound	95% CI for Odds Ratio Upper Bound
Private	Intercept	-2.66	1.10	5.86	1	.016			
Garage	Age	-.01	.01	2.01	1	.157	.99	.97	1.01
	Male *(n=46)*	2.15	1.04	4.33	1	.038	8.60	1.13	65.37
	Female *(n=1)*	0	.	.	0	.	.	.	.
Public	Intercept	-3.05	1.12	7.43	1	.006			
Area	Age	-0.01	.01	.19	1	.660	1.00	.97	1.02
	Male *(n=35)*	1.84	1.04	3.15	1	.076	6.31	.83	48.18
	Female *(n=1)*	0	.	.	0	.	.	.	.
Bastions	Intercept	-1.83	.70	6.75	1	.009			
	Age	.00	.01	.13	1	.725	1.00	.98	1.03
	Male *(n=26)*	-.10	.54	.04	1	.852	.91	.32	2.58
	Female *(n=5)*	0	.	.	0	.	.	.	.
Cliffs	Intercept	-2.42	1.14	4.54	1	.033			
	Age	.00	.02	.03	1	.871	1.00	.96	1.04
	Male *(n=7)*	-.47	.83	.31	1	.576	.63	.12	3.21
	Female *(n=2)*	0	.	.	0	.	.	.	.
Bridge	Intercept	-2.88	1.06	7.35	1	.007			
	Age	.02	.02	1.35	1	.246	1.02	.99	1.06
	Male *(n=6)*	-1.42	.69	4.24	1	.039	.24	.06	.93
	Female *(n=4)*	0	.	.	0	.	.	.	.
Institution	Intercept	-4.22	1.22	12.01	1	.001			
	Age	.02	.01	2.34	1	.126	1.02	.99	1.05
	Male *(n=18)*	1.07	1.05	1.03	1	.309	2.92	.37	22.94
	Female *(n=1)*	0	.	.	0	.	.	.	.
Other	Intercept	-1.66	.74	5.05	1	.025			
	Age	-.01	.01	.17	1	.680	1.00	.97	1.02
	Male *(n=25)*	.12	.58	.04	1	.837	1.13	.36	3.52
	Female *(n=4)*	0	.	.	0	.	.	.	.

Note: Reference group: Home (*n* = 173), CI = Confidence Interval

Conclusion

This chapter is a review of various results which indicate several patterns of suicide in the Maltese islands. Males and females aged 46 to 60 years seem to be at a higher risk of suicide in Malta when compared to other age brackets. When compared to males of the same age and to other females in different age brackets, a higher percentage of young females, aged 14 to 21 years, has been noted to have died by suicide. Suicide shows a slightly higher prevalence in March and August, reflecting higher numbers in spring and summer. It has also been noted that a higher percentage of females die by suicide on Thursdays and Fridays whilst older males tend to choose mornings when compared to younger ones. Males tend to prefer hanging whilst females tend to jump to death more frequently than men. Death by carbon monoxide poisoning was particular to males. In general, home is the preferred place of suicide for both males and females followed by private garages for males and the bastions for females. The bastions are, in fact, the most popular location to jump to death especially in the Southern Harbour region where most bastions are located. It was more common to jump off the Mosta bridge in the Northern district where the bridge is located. Jumping as a method of suicide happened at double the rate on Wednesdays even though there is a fair distribution between the other days of the week. A higher percentage of firearms use was noted in the South Eastern district and in Gozo. Young adults aged 14 to 21 only used hanging, jumping and firearms to die by suicide. Suicides were more common in the morning when death occurs at home but more common in the afternoon when occuring in a private garage and in the morning and evening when occurring in an institution. A higher percentage of persons who died by jumping off the bastions did so within a specific three-hour bracket early in the morning whilst those completing suicide by jumping off the bridge did so in the morning and early afternoon only. Suicide in public places seems to happen more frequently in daylight than after dusk. Suicide of older adults was more frequent in the mornings when compared to any other time of the day particularly on Tuesdays. A statistically significant difference was noted where older females are more likely to die jumping rather than by hanging whilst males prefer hanging as a method of suicide. It was also noted that young adults aged 22 to 35 years, who die by jumping off heights, preferred to die at home. There were also various

relationships which were noted but which could not be statistically or empirically established either because of the sample size, which is actually all the suicides recorded in Malta within the period under review or due to lack of collection of data by the police.

Chapter 8 - Investigative Challenges (Results Chapter 3)

Overview

One of the challenges in research is to have complete data. Data are the foundations upon which any empirical study rests. The completeness of data impinges on its reliability, which is of paramount importance in deriving whatever knowledge is important for the research. It is, therefore, an investigative challenge to ascertain the best process by which data are collected and where data is incomplete, to know how this can affect the research process.

The results presented in this chapter highlight the investigative challenges posed by the collected data. It exhibits discrepancies between what data are collected by the police and what are proposed as important variables of suicide. The analysis of the shortfalls in the collected data and their interpretation in later chapters should serve in the discernment not only of the dynamics of suicide in Malta, but also of the operation of the police as data collectors.

A Note on the Variables

The variables described in the preceeding two chapters, totalling 46 variabes, were expanded into 61 working variables in SPSS. The expanded SPSS version of the variables is described in Appendix 1 – The coding dictionary. As happened in the preceding results chapter, only 60 variables were utilised as Variable 28 – the last known action - could not be utilised due to having a descriptive outcome. The 60 variables were divided into four classifications: demographic variables accounted for 36 out of the 60 variables or 60% of the total number of variables; variables related to suicidal behaviour accounted for 15% *(N = 9)*; variables related to history of suicide had the smallest portion of variables at 6.67% *(N = 4)* and variables related to life events had an 18.33% share *(N = 11)*.

Results

Table 1 shows the number of marked variables together with an average of marked variables per case in all four classifications described above. Demographic variables were the most collected type of variables. Each case reviewed had, on average, 16.04 demographic variables on which information was collected, or 44.55% of all possible demographic variables *(N = 36).* On average, only 1.04 variables or 11.61% of variables relating to suicidal behaviour were collected. Only 4.46% of variables related to the two other classifications, that is variables related to history of suicide (average of 0.18 variables) and those related to life events (average of 0.49 variables), were collected. In total, in each case of the 359 cases of suicide, an average of 17.75 variables or 29.59% of variables were marked and collected.

Table 1.

Average marked variables per classification (N = 359)

	Number of variables	% of total variables	Total of possibilities	Total marked variables	Average marked variables	% of marked variables
Demographics	36	60.00	12924	5758	16.04	44.55
Suicidal Behaviour	9	15.00	3231	375	1.04	11.61
History of suicide	4	6.67	1436	64	0.18	4.46
Life Events	11	18.33	3949	176	0.49	4.46
Total	60	100.00	21540	6373	17.75	29.59

The number of marked variables per case varied between 11 variables (N = 4) and 32 variables (N = 1). Table 2 shows the number of cases per number of marked variables for the 359 cases of suicide reviewed. In 266 cases (or 74.09% of cases), 19 variables or fewer out of the available 60 variables were marked, whilst in 93 cases (or in 25.91% of cases) 20 or more variables were annotated.

In 4 cases, the lowest number of marked variables (11) was recorded, whilst in 1 case the highest number of marked variables (32) was recorded. In 47 cases (or 13.09%), 18

variables or 30% of all variables were marked. This was the most common number of variables marked.

Table 2.

Number of cases per number of marked variables (N = 359)

Number of marked variables	% of variables	Number of cases	% of cases
11	18.33	4	1.11
12	20.00	14	3.90
13	21.67	23	6.41
14	23.33	25	6.96
15	25.00	31	8.64
16	26.67	45	12.53
17	28.33	40	11.14
18	30.00	47	13.09
19	31.67	37	10.31
20	33.33	28	7.80
21	35.00	13	3.62
22	36.67	13	3.62
23	38.33	14	3.90
24	40.00	8	2.23
25	41.67	6	1.67
26	43.33	2	0.56
28	46.67	5	1.39
30	50.00	2	0.56
31	51.67	1	0.28
32	53.33	1	0.28

The average recorded data per police district is presented in Table 3. It shows that District 10, which comprises all of the region of Gozo and Comino, has the highest

percentage of annotations of variables at an average of 19.85 variables per case (or 33.08%). District 7, comprising eight localities in central Malta (as described in Chapter 5), had the lowest number of annotations of variables at an average of 16.77 variables per case (or 27.95%).

The lowest percentage of recorded data per classification was recoded in District 6A, where no variables related to history of suicide were recorded in all 13 cases investigated by the same district. The highest percentage of recorded data per classification was recorded in District 9, with an average of 18.16 demographic variables, or 50.44% *(N = 44).*

Table 3.

Average recorded data per police district

Police District	Cases	% of total cases	Avr. marked variables (Demogr.)	% marked variables (Demogr.)	Avr. marked variables (Behaviour)	% marked variables (Behaviour)	Avr. marked variables (History)	% marked variables (History)	Avr. marked variables (Life Events)	% marked variables (Life Events)	Avr. marked variables (Total)	% marked variables (Total)
District 1	51	14.21	15.90	44.17	1.31	14.60	0.20	4.90	0.27	2.50	17.53	29.22
District 2	19	5.29	16.42	45.61	1.00	11.11	0.11	2.63	0.53	4.78	17.89	29.82
District 3	21	5.85	15.00	41.60	1.05	11.64	0.19	4.76	0.57	5.19	16.90	28.17
District 4	37	10.31	16.54	45.95	0.89	9.91	0.14	3.38	0.54	4.91	17.97	29.95
District 5	52	14.48	16.02	44.50	1.13	12.61	0.23	5.77	0.56	5.07	17.77	29.62
District 6	22	6.13	16.36	45.45	0.64	7.07	0.32	7.95	0.41	3.72	17.77	29.62
District 6A	13	3.62	16.23	45.09	0.92	10.26	0.00	0.00	0.38	3.50	17.77	29.62
District 7	39	10.86	15.26	42.38	0.95	10.54	0.15	3.85	0.44	3.96	16.77	27.95
District 8	48	13.37	16.65	46.24	1.10	12.27	0.21	5.21	0.75	6.82	18.94	31.56
District 9	44	12.26	18.16	50.44	1.20	13.38	0.23	5.68	0.82	7.44	17.09	28.48
District 10	13	3.62	17.69	49.15	0.92	10.26	0.15	3.85	0.38	3.50	19.85	33.08
	359	100	16.37	45.47	1.06	11.79	0.19	4.74	0.54	4.89	17.75	29.59

In general, when considering all the reviewed cases of suicide between 2003 and 2017 (N = *359*), an average of 17.75 variables per case (or 29.59% of all variables) was annotated. There was a minimal lower percentage of variables (28.75%) than the average annotated in the first half of the period under review, that is between 2003 and 2009 *(N = 153),* but a slightly higher percentage (30.21%) than the average for the second half of the period under review, that is between 2010 and 2017 *(N = 206).*

A steeper increase in the percentage of marked variables (32.69%) was noted for the last two years under review, that is 2016 and 2017 (Table 4). The same pattern is noted in all the four classifications of variables in the three time-periods.

Table 4.

Average recorded data in different indicated periods of time

	Cases	Average marked variables (Demogr.)	% marked variables (Demogr.)	Average marked variables (Behaviour)	% marked variables (Behaviour)	Average marked variables (History)	% marked variables (History)	Average marked variables (Life Events)	% marked variables (Life Events)	Average marked variables (Total)	% marked variables (Total)
2003 - 2017	359	16.04	44.55	1.04	11.61	0.18	4.46	0.49	4.46	17.75	29.59
2003 - 2009	153	15.68	43.55	1.01	11.26	0.14	3.43	0.42	3.80	17.25	28.75
2010 - 2017	206	16.31	45.29	1.07	11.87	0.21	5.22	0.54	4.94	18.13	30.21
2016 - 2017	44	17.25	47.92	1.34	14.90	0.44	10.80	0.59	5.37	19.62	32.69

When considering reports of deaths by suicide of foreigners *(N = 57),* as opposed to those by Maltese nationals *(N = 302),* a slightly higher percentage of marked variables was noted in reports regarding foreigners (31.32%) when compared to those relating to Maltese nationals (29.26%), (Table 5).

Table 5.

Average recorded data per nationality

	Cases	Total marked variables	Average marked variables	% marked variables
Maltese	302	5302	17.55	29.26
Foreigners	57	1071	18.79	31.32
Total	359	6373	17.75	29.59

The average number of variables on which data was collected when considering cases by the method of death ranged from 28.02% of variables in cases of jumping from heights *(N = 91)* to 31.06% in cases of suicides due to substance use. *(N = 11),* (Table 6).

The average percentage of marked demographic variables is comparable where the method is one of the seven most commonly used, that is by hanging, by the use of firearms, by jumping from heights, by the use of substances, by carbon monoxide poisoning, by downing and by self-stabbing. These showed a comparable range of between 43.13 % in cases of suicide by jumping from heights to 46.72% in cases of substance abuse. A lower percentage of 37.96% of demographic variables was marked in cases of suicides by other methods in which an average of 2.5 variables or 27.78% percentage of variables relating to suicidal behaviour were marked. This represents the highest percentage of annotations of variables relating to suicidal behaviour out of all the eight classifications. The other seven classifications had a range of between 0.75 variables or 8.33% (Drowning) and 1.33 variables or 14.81% (Firearm).

No data was collected for variables relating to history of suicide in cases of death by carbon monoxide poisoning. However, cases of the same method of suicide received the highest percentage of marked variables relating to life events (7.07%).

Table 6.

Average recorded data per method of suicide

Method of suicide	Cases	% of total cases	Avr. marked variables (Demogr.)	% marked variables (Demogr.)	Avr. marked variables (Behaviour)	% marked variables (Behaviour)	Avr. marked variables (History)	% marked variables (History)	Avr. marked variables (Life Events)	% marked variables (Life Events)	Avr. marked variables (Total)	% marked variables (Total)
Hanging	180	50.14%	16.23	45.09%	1.02	11.30%	0.24	5.97%	0.54	4.95%	18.08	30.14%
Firearm	45	12.53%	16.31	45.31%	1.33	14.81%	0.11	2.78%	0.62	5.66%	18.02	30.04%
Jumping	91	25.35%	15.53	43.13%	0.84	9.28%	0.09	2.20%	0.32	2.90%	16.81	28.02%
Substance	11	3.06%	16.82	46.72%	1.18	13.13%	0.18	4.55%	0.36	3.31%	18.64	31.06%
CO Poisoning	9	2.51%	16.11	44.75%	1.22	13.58%	0.00	0.00%	0.78	7.07%	18.11	30.19%
Drowning	8	2.23%	16.75	46.53%	0.75	8.33%	0.38	9.38%	0.38	3.41%	18.50	30.83%
Self-Stabbing	9	2.51%	15.89	44.14%	1.22	13.58%	0.22	5.56%	0.44	4.04%	17.67	29.44%
Other	6	1.67%	13.67	37.96%	2.50	27.78%	0.17	4.17%	0.50	4.55%	17.00	28.33%

The average recorded data per location of suicide as reported in Table 7 shows that the average number of variables on which data was collected when considering cases by the location of suicide ranged between 25.50% of variables when death occurred over a bridge to 31.57 % of variables when death occurred in the category 'Other' locations. This marks a difference of 6.07% of annotated variables in suicides found in different locations.

Mean differences of annotated variables within the four categories of data were noted. The lowest difference was noted in the category 'Life events' with a difference of 4.55% in recorded variables between the highest in this category, that is in suicides which occurred at home (5.73%) and the lowest, that is in suicides which occurred at the bastions (1.18%). The highest difference in percentage of annotated variables was noted in the category 'Suicidal behaviour' where a difference of 13.67% was noted. In this category the highest number of recorded variables was in suicides which occurred in the category 'Others' (17.00%) and the lowest was in suicides which occurred at a bridge (3.33%).

No data was collected on variables related to the classification 'History of suicide' in deaths which occurred at a bridge. Suicides which occurred in the same location received the least annotation in the category 'Suicidal behaviour' (3.33%,) and the second least in the category 'Life events' (1.82%).

Table 7.

Average recorded data per location of suicide

Location of suicide	Cases	% of total cases	Avr.marked variables (Demogr.)	%marked variables (Demogr.)	Avr.marked variables (Behaviour)	% marked variables (Behaviour)	Avr.marked variables (History)	%marked variables (History)	Avr.marked variables (LifeEvents)	% marked variables (LifeEvents)	Avr.marked variables (Total)	%marked variables (Total)
Home	175	48.75%	16.09	44.69%	1.11	12.33%	0.22	5.50%	0.63	5.73%	17.93	29.88%
Garage	47	13.09%	16.45	45.69%	1.21	13.44%	0.04	1.00%	0.47	4.27%	18.21	30.35%
Public	36	10.03%	16.97	47.14%	0.69	7.67%	0.19	4.75%	0.42	3.18%	18.42	30.70%
Bastions	31	8.64%	15.23	42.31%	0.87	9.67%	0.13	3.25%	0.13	1.18%	16.42	27.37%
Cliffs	9	2.51%	14.44	40.11%	0.67	7.44%	0.11	2.75%	0.33	3.00%	15.33	25.55%
Bridge	10	2.79%	14.80	41,11%	0.30	3.33%	0.00	0.00%	0.20	1.82%	15.30	25.50%
Institution	19	5.29%	14.47	40.19%	0.74	8.22%	0.26	6.50%	0.53	4.84%	16.37	27.28%
Other	32	8.91%	16.66	46.23%	1.53	17.00%	0.22	5.50%	0.28	2.55%	18.94	31.57%

The average number of variables on which data was recorded by the police when considering suicides by the age of the deceased is shown in Table 8. Data ranged from 27.37% in suicides within the 46 to 60 years age bracket to 32.67% in the five cases where age was not recorded.

The average percentage of annotated variables in all the age categories and the category where age was not recorded was 29.71. When excluding the five cases were age was not recorded (which also had the highest percentage of annotated variables at 32.67%), only in one age group was the percentage of annotated variables higher than the average, that is in the youngest cohort, (14 to 21 years) where the percentage of annotated variables stood at 31.40%.

The percentage of annotated variables were comparable when data is considered per gender as reported in Table 9.

Table 8.

Average recorded data per age of deceased

Age group	Cases	% of total cases	Avr.marked variables (Demogr.)	% marked variables (Demogr.)	Avr.marked variables (Behaviour)	% marked variables (Behaviour)	Avr.marked variables (History)	% marked variables (History)	Avr. marked variables (LifeEvents)	% marked variables (Life Events)	Avr.marked variables (Total)	%marked variables (Total)
14 - 21 years	19	5.29%	16.53	45.91%	1.00	11.11%	0.53	13.25%	0.53	4.82%	18.84	31.40%
22 - 35 years	73	20.33%	15.59	43.31%	1.33	14.78%	0.18	4.50%	0.34	3.09%	17.45	29.08%
36 - 45 years	82	22.84%	16.04	44.56%	1.22	13.56%	0.15	3.75%	0.55	5.00%	18.00	30.00%
46 - 60 years	100	27.86%	16.44	45.67%	0.88	9.78%	0.16	4.00%	0.54	4.91%	16.42	27.37%
61 - 75 years	54	15.04%	15.44	42.89%	0.93	10.33%	0.20	5.00%	0.48	4.36%	17.19	28.65%
over 75 yrs.	26	7.24%	16.27	45.19%	0.65	7.22%	0.00	0.00%	0.54	4.91%	17.31	28.85%
Not recorded	5	1.39%	18.00	50.00%	0.80	8.89%	0.40	10.00%	0.40	3.64%	19.60	32.67%

Table 9.

Average recorded data per gender

Gender	Cases	% of total cases	Avr.marked variables (Demogr.)	%marked variables (Demogr.)	Avr.marked variables (Behaviour)	% marked variables (Behaviour)	Avr.marked variables (History)	%marked variables (History)	Avr.marked variables (LifeEvents)	%marked variables (LifeEvents)	Avr.marked variables (Total)	%marked variables (Total)
Male	313	87.19%	16.09	44.69%	1.03	11.44%	0.18	4.50%	0.50	4.55%	17.80	29.67%
Female	46	12.81%	16.04	44.56%	1.16	12.89%	0.16	4.00%	0.47	4.27%	17.84	29.73%

Conclusion

Demographic variables were the most thoroughly collated group of the four classifications of variables by the police. The other classifications were notably recorded less frequently. On average, 30 per cent of the indicated variables were annotated by the police. Although some differences between police districts were noted, these could not be inferentially tested due to the low frequency of annotations. On a positive note, however, the average of annotated variables rose in the last two years under review. Police tend to gather more data in suicide which occurred in non-standard locations (referred to in the category “Others”) and in suicides of young persons. There may also be differences in the amount of data per category. In all scenarios, these differences may not be considered as statistically significant due to the low numbers. An insignificant difference in the amount of data collected by the police was noted when this was examined per gender of the deceased.

Chapter 9 – The Investigative Support Tool

Accurate statistics and data relevant to suicide are fundamental in developing research and in the study of suicide. Collecting data on suicide in a standardised manner has been identified as a priority by different organisations including the Australian Institute of Health and Welfare (Harrison, Pointer & Elnour, 2009) and the World Health Organisation (WHO, 2014). Efforts to collect data in a standardised manner have however been few and far apart. This study is a contribution towards this cause by proposing a standard data collection tool to improving official data. Ensuring better data collection by the police and how and what data is collected is a good start and first step forward in this direction. It would ensure that what is measured is actually what is required in a valid and reliable manner.

One of the most frustrating matters in suicide data is that of poor validity as it is difficult to measure variables of a subjective nature with precision. In order to understand the different circumstances in which suicide occurs and the factors that lead up to it, a detailed understanding of all the different elements, and how they occur in conjunction with one another, is needed. Whilst some will be easier to ascertain, as they are readily and objectively observable, others are not. This does not mean, though, that they are not important and should not be noted; rather, that clearer guidance is needed as to reliable indicators of the presence of these less observable or more subjective elements, and how best to capture them.

Even though research into risk factors of suicide can be said to be extensive, three types of limitations were noted. These are somewhat generalised as they are not bound to one class of variables but ingrained in the way suicide research has been conducted and can therefore be said to be limitations of research rather than pertaining to any one class of variables. These limitations are all circumvented by the Investigative Support Tool.

The first limitation is that certain factors, known to be related to suicide, are not studied enough. Sexual orientation, race, immigration status, religion, details about the type of family contact the person has with parents, siblings, children and the extended family, what contact the person has with close friends and in social affiliations and if the person smoked, consumed alcohol, was involved in gambling or consumed illicit substances are

all demographic factors that do not commonly feature in literature but were deemed important within the scope of the IST. Other variables like the level of suicidal behaviour, history of suicide in the family and close friends, physical disability issues and significant life events are all somewhat limitedly studied in literature. Throughout the review of literature, it has been shown that some minority groups linked to some of these features were at higher risk of suicide (Refer to Chapter 3 – Ideographic factors of suicide). It was also noted that protective factors like the positive effect of having contact with family and friends were less studied than risk factors. The literature seems to be dominated by variables related to mental illnesses but seems to disregard or rather diminish the importance of the multitude of variables indicated above.

The second limitation is that variables are, many times, studied in isolation. This has limited our knowledge of how different variables interact with other factors. Using one factor to predict something as complex as suicide is a limitation that has hindered the further advancement of suicide research (Franklin et al., 2017). In the IST, this is addressed as all variables are collected as equally important, whatever the classification or the demonstrated importance in research. The scope of including a vast array of variables in the IST is exactly to counter this limitation by having all the required information available on one standard form. If and when examined together, such wide-ranging information would have the effect that comorbidity and the interaction of variables would be identified. The answer to this limitation is therefore to collect as much diverse information on every person completing suicide as possible as such is the scope of the IST.

The third limitation is that studies did not report statistics comprehensively enough to understand the effect of different variables. Most studies worked on samples of the population, some of which on samples within minorities, which cannot necessarily be generalised. The IST is comprehensive in the number of variables indicated. More than that, it is also intended to be used, as have been used in this study, on all the reports and investigations of suicide and not on a sample. Having data from all reports rather than from a sample has many added advantages amongst which are validity and reliability issues.

The overall effect of each and every variable should not be downplayed due to an insignificant or a weak association with suicide. Rather, any relationship a variable might have to suicide cannot be considered to have a trivial role in the prediction of risk of suicide as it could be that the relationship has yet to be identified.

This means that any data has some stability but is still limited and bound to other factors, such as under-reporting, which are constant over a long period of time, in a way that if under-reporting remains constant over time, then changes in trends or rates may be considered as valid. One must acknowledge, however, that suicide data will always be subjective; first due to the complexity of suicidal behaviour and suicide in general and secondly due to multiple ways of recording such data. Whereas, however, the subjective nature of the data is inevitable, the subjective way how this is collected can be mitigated by having a standard which everyone follows; hence the importance of the proposed Investigative Support Tool (IST).

Limitations to Variables Relating to Impulsivity and Planned Suicide

In subjects with on-going development such as suicide, it is rarely the case to have an uncontested reasonable definition of things. A straight interpretation of any matter may hamper the growth of different avenues of the same subject. Such a limitation may be manifested in having suicides labelled as either impulsive or planned solely on the elimination of one another; if signs of planning were shown, then it was deemed as a planned suicide; where no such signs were displayed, then the suicide was deemed as impulsive. This may be considered a limitation to data collected in this study with regards to impulsive and planned suicides (Variable 22 on the IST) and to the IST itself.

The study could have benefitted more had the classification itself been “planned vs unplanned suicide”. Impulsivity carries the psychopathological connotation of rashness and all the similar behaviours when the variable was actually gauging planned or unplanned actions. Impulsivity has been seen to be an array of behaviours which, although similar in nature, vary in their effect of other behaviours. These could be

measure by psychometric tests like the UPPS impulsive Behaviour Scale but this goes beyond the scope of this study.

The variable does not distinguish between an impulsive person and an impulsive act of suicide. A suicide displaying some sort of impulsivity was deemed as an impulsive suicide. This may be short of allowing for an impulsive person to have planned the suicide as opposed to a person who, at a spur of a moment, decides to terminate life by suicide which would be considered as an unplanned suicide. Baca-Garcia et al., (2005) has framed this as the difference between impulsivity as a state (attempt) and impulsivity as a trait (attempter).

The relationship between impulsivity as trait and impulsivity as a state may not be a straightforward one. It has been noted that impulsivity may be a distal risk factor of suicide influencing suicidal behaviour through the aggregation of stimulating behaviour. Hence one might engage in more suicidal behaviour (and thus plan for suicide in the process) in order to gratify one's needs rather than opt for a short way to suicide by acting impulsively (Witte et al., 2008).

Limitations on Variables Relating to Suicidal Behaviour

Most often, in clinical and other settings, when behaviours of a similar nature are stratified on a continuum, one often thinks that they somewhat follow a linear trajectory. This could result in assuming that actions happen only on this continuum without progressing laterally or differently from the established path. This study included the collection of data on suicidal behaviour (Variable 23 on the IST). The variable had various sub classifications based on a continuum of the "ideation to action" models. Every sub classification was clearly defined in the "Content Analysis" section but this may not have guaranteed that behaviours were classed within the exact parameters of what was defined. The sub classes may have been broad enough to overlap and some behaviours could possibly fall within more than one definition or sub class. This limited the value of the data and could possibly have had an effect on the internal validity of the variable.

A second limitation is that the development of suicidal behaviour is not static or follows a singular path. A person could progress or regress into various stages within the continuum. Quantifying such behaviour could prove difficult and more complex than simply annotating their presence or not and its complexity may deter police officers from collecting such data in a proper manner thus limiting its value. This was manifested in the collected data as variables within the classification were less frequently annotated by the police.

Another limitation was that no time frame was established in which suicidal behaviour was displayed. Behaviour that was exhibited months or years before the suicide, but still included in the police report, was annotated and thus the real effect on suicide could not be determined.

The Investigative Support Tool is the result of the review of literature and police reports. It is a four-page fill-in and flag-form containing 46 items as described in Chapter 5 (Methodology), which were expanded to 61 variables for practical use in SPSS as per Appendix 1 – The coding dictionary. All the items and variables were found to be related to suicide through the review of literature. Some of these variables like mental illness or previous suicide attempts are known to have a direct bearing on suicide. Other variables have been noted to be comorbid or could have an indirect effect on suicide by influencing other variables which are then directly related to suicide, for example socio-economic variables which, of themselves, may rarely have a direct bearing on suicide but coupled with mental illness, they are then quite important to monitor or adjust. All variables are given equal weighting within the IST as the intention is to gather as much data on the person completing suicide as possible.

Name:		ID Card:	
Police Ref:		AG Ref:	

Demographics:

1	DOB:	_____/_____/_____		Age: _____
2	Gender:	☐M ☐F	3	Orientation: ☐Straight ☐LGBTIQ
4	Race:	☐ Caucasian ☐ Black ☐ Asian ☐ Arab Other_____		
5	Nationality:	_____		
6	Immigration status:	☐Natural born ☐Naturalised ☐ Illegal Immigrant Other _____		
7	Status:	☐Single Never Married ☐Single Other ☐Married (_____ Years) ☐Divorced/Annulled (_____Years) ☐Re- Married (_____ Years) ☐In a Relationship (_____ Years) Other info _____ _____		
8	Residence:	_____ ☐Southern Harbour ☐Northern Harbour ☐South Eastern ☐Western ☐Northern ☐Gozo		
9	Religion:	☐ Catholic ☐ Muslim ☐ Agnostic Other_____		
10	Family:	**Parents:** ☐ Living ☐ Regular Contact ☐Occasional Contact ☐ No contact ☐ Deceased Years before suicide: _____ Age when Mother died: _____ Age when Father died: _____		
11		**Siblings:** ☐ Living ☐ Regular Contact ☐Occasional Contact ☐ No contact ☐ Deceased Years before suicide:		
12		**Children:** _____Females _____Males Children sharing home : _____ Children living out of home: _____ ☐ Living ☐ Regular Contact ☐Occasional Contact ☐ No contact ☐ Deceased Years before suicide:		
13		**Extended:** ☐ Regular Contact ☐Occasional Contact ☐ No contact		
14	Friends:	Close Friends: Same sex: _____ Contact : ☐Frequent ☐Rare Opposite sex: _____ Contact : ☐Frequent ☐Rare _____ _____ _____		
15		Social affiliations: ☐Yes ☐No _____ _____ _____		
16	Vices:	☐Smoking ☐Drinking ☐Gambling ☐Illicit Substances ☐Other/s _____ _____		

	Death:			
17	Date of Death:	_____/_____/_____	18	Time of Death: _____:_____
19	Place of Death:	_____		
20	Type of POD:	_____		
21	Method:	☐ Hanging ☐ Proper knot ☐ Improvised knot _____ _____		
		☐ Firearm ☐ Owned ☐ Obtained _____ _____		
		☐ Jumping ☐ Public ☐ Secluded _____ _____		
		☐ Substance ☐ Prescription ☐ Illicit _____ _____		
		☐ CO Poisoning ☐ Vehicle ☐ Other _____ _____		
		☐ Other _____ _____		
22	Planning:	☐ Planned _____ _____ _____		
		☐ Impulsive _____ _____ _____		
23	On Suicide:	**Self-Harm**: Type _____ Description _____ _____		
		Ideation: ☐ Minimal ☐ Advanced Description _____ _____		
		Desire to attempt: ☐ Yes ☐ No Description _____ _____		
		Planned to attempt: ☐ Early stage ☐ Advanced stage Description _____ _____		
		Favourable attitude: ☐ Somewhat ☐ Highly Description _____ _____		
		Attraction to death: ☐ Yes ☐ No Description _____ _____		

		Decided but not attempted: ☐ Yes ☐ No Description _____ _____
		Prepared to attempt: ☐ Yes ☐ No Description _____ _____
24		**Attempted before** ☐ Yes ☐ No If attempted state method: ☐ Hanging ☐ Firearm ☐ Jumping ☐ Substance ☐ CO Poison ☐ Other _____ _____ Description/ Other Info _____ _____ _____
25		**History of suicide by family:** ☐ Yes ☐ No Description/ Other Info _____ _____ _____
26		**History of suicide by close friends:** ☐ Yes ☐ No Description/ Other Info _____ _____ _____
27	Suicide Note:	☐ Yes ☐ No
28	Last known action:	_____ _____ _____

Employment:

29	Employment:	☐ Public	Years _____	☐ Self-Employed	Years _____
		☐ Private	Years _____	☐ Unemployed	Years _____
30	Income:	☐ Unknown	☐ <€12,000	☐ <€30,000	☐ >€30,000
31	Education:	☐ Compulsory	☐ Higher	☐ Tertiary	
32	Skills:	☐ General skills	☐ Specialised skills	☐ No skills	

Disability:

33	Physical Disability:	☐ Restricts Movement	☐ Impairs Movement	☐ Vision	☐ Hearing
34	Chronic illnesses:	☐ None	☐ Diabetes	☐ Hypertension	☐ HIV/Aids
		☐ Digestive	☐ Pulmonary	☐ Coronary	☐ Other
		☐ Dementia	☐ Alzheimer's	☐ Parkinson's	
		☐ Other degenerative or progressive disease _____			
		☐ Other chronic illness _____			

35	Mental Health:	☐ Depression ☐ Anxiety Disorders ☐ Personality Disorders ☐ Official Diagnosis:	☐ Hopelessness ☐ Mood Disorder	☐ Bi-Polar Disorder ☐ Schizophrenia ☐ Sleeping Disorders _____ _____ _____

Life Events:

36	☐ Child abuse	_____ _____ _____	☐ LTE* ☐ IPD**
37	☐ Trauma/Loss of function	_____ _____ _____	☐ LTE ☐ IPD
38	☐ Financial Difficulties	_____ _____ _____	☐ LTE ☐ IPD
39	☐ Loss of Employment	_____ _____ _____	☐ LTE ☐ IPD
40	☐ Marriage/Relationship breakdown	_____ _____ _____	☐ LTE ☐ IPD
41	☐ Loss of child custody	_____ _____ _____	☐ LTE ☐ IPD
42	☐ Death of loved one	_____ _____ _____	☐ LTE ☐ IPD
43	☐ Life-threatening illness	_____ _____ _____	☐ LTE ☐ IPD
44	☐ Legal Problems	_____ _____ _____	☐ LTE ☐ IPD
45	☐ Criminality	_____ _____ _____	☐ LTE ☐ IPD
46	☐ Other	_____ _____ _____	☐ LTE ☐ IPD

Onset of event: *Long term event **Immediately prior to death event

Some of the data included in the IST is already gathered by various state agencies for their own requirements. For example; income data is meticulously held on every person by the Commissioner of Inland Revenue. In the IST, however, such a high level of detail is not required as the scope of the IST is to gather data for a broader picture. The IST is, however, a comprehensive form encompassing data required to have a wide view of persons who died by suicide in order to have a better knowledge of the true nature and characteristics of suicide in the Maltese islands.

The variables included in the IST can be broadly classified into four categories:

i. demographic data which includes age, gender, race, marital status, religion, ties to family and friends, vices and physical disabilities and ailments and some socio-economic information like social affiliations, employment, education and skills;
ii. history of suicide and mental illnesses in the family or very close friends including attempts or traits of known mental health illness like depression and bi-polar disorder;
iii. variables related to suicidal behaviour including self-harm, ideation, desire to attempt suicide, planning for suicide, having a favourable attitude and attraction to death and preparing for actual suicide;
iv. life events which affect a person significantly including child abuse, trauma or loss of function, financial difficulties, loss of employment, marriage or a significant relationship breakdown, loss of child custody, death of a loved one, life-threatening illnesses, legal or criminal problems or other actions that significantly mark a person for life. These can be long term events or something that happens immediately prior to suicide.

A brief description of each variable is given in Chapter 5 (Methodology), and in Appendix 1 – The Coding Dictionary.

Other Potential Implications of the IST

Reducing Bias/Improvisation

As a standard form, the IST has the potential of minimising any individual bias by the police office entering the report. The form is a universal guide to police officers as to what data is important to be extracted and collected and in what way this should be done. In the absence of such a minimum standard, any police officer might improvise as to what information is required in a suicide investigation and choose which information is recorded and which is discarded. Such improvisation is counter to best practices, first by increasing individual bias and secondly by creating difficulties in the extraction of data.

Increasing Efficiency and Effectiveness

A standardised data collection form, such as the IST has the potential of shortening the time for data collection especially on the location of suicide. Subsequently, having all data on one form will reduce reporting time and increase the rate of interpretation of data. In this manner, efficiency is bolstered. The IST would also result in easier- to-interpret- data, with less handling and less supervisory costs. It would also assure better quality control in reporting in general. This would increase the effectiveness of police investigations.

Making Suicide Data Interchangeable with Other Professions

The outcome of data from the IST would be in a standard format and thus would have the benefit of being simpler to share with other professions party to suicide prevention and in the assistance of victims and their families. Sharing data in a standard format between professions would increase the interoperability of the same professions, even

across jurisdictions and address the nomenclature difficulty ever present in professional settings.

Conclusion

In essence, The Investigative Support Tool, is a simple to use data collection assistance for police officers to use when investigating suicide. It can be easily filled in at the location of suicide and its outcomes are all positive: it shortens the time of data collection and would result in better reporting, which would ensure faster interpretation of information for the benefit the investigation. It increases the efficiency and effectiveness of data collection and most importantly minimises individual bias. The IST also facilitates the exchange of data between professionals promotes the collection of standaridised data between various agencies.

Chapter 10 – Discussion

Introduction

This chapter is a reflection on the main findings of this study, together with an acknowledgement of its limitations, practical implications and some recommendations. The chapter is divided into three parts. Part 1 is a discussion on the nature and characteristics of suicide in Malta. Part 2 is a discussion on the use of data for investigative purposes, and serves as a form of introduction to the Investigative Support Tool (IST). Part 3 discusses the limitations of the study together with its practical implications and recommendations for future research.

Part 1 – The Nature and Characteristics of Suicide in Malta

On Hanging

The preferred method of suicide for a given population has historically changed over time, and is obviously not necessarily the same in different groups or cultures. In Malta, hanging has gained popularity in recent time and continues to increase in frequency, as noted in this study. In the study conducted by Meilak et al. (1974) hanging was the second most common method of suicide after jumping from heights. Over the span of fifteen years, this study sees hanging as a method of suicide increasing in the latter half of the time-frame examined (2011 to 2017), whilst jumping from heights decreased within approximately the same period (2009 – 2017).

Hanging is now the most common method of suicide in Malta, as it is worldwide (Biddle et al, 2010). The increase in the percentage of hanging cases of suicides in Malta has been mostly due to an increase in male suicides using this method. The overall increase is similar to what has been noted internationally, even though a trend of increase in female suicide by hanging has also been noted in different countries (Gunnell, Benewith, Hawton, Simkin & Kapur, 2005). An increase in hanging as a choice of method of suicide has been reported in various other countries; in Switzerland (Reisch, Hartmann,

Hemmer, & Bartsch, 2019); in Italy (Russo, Verzeletti, Piras & De Ferrari, 2016); in England and Wales (Office for National Statistics, 2019); in Mexico (Hernández-Alvarado et el., 2016) and in the USA (Baker, Hu, Wilcox, Baker, 2013).

The increased proportion of suicide by hanging would naturally result in a decrease in other methods of suicide. For example; in England and Wales, a decrease in the second most common method of suicide, that is death by poisoning, was recorded in the last years (Office for National Statistics, 2019). In the United States, this expected decrease was more pronounced in suicides by the use of firearms (Baker, Hu, Wilcox, Baker, 2013). In Malta this was noted particularly in the method of jumping off heights.

There may be various reasons why hanging has become more common as a method of suicide. The prevention of hanging is quite challenging, as one of the main focuses of any suicide prevention effort (even in unstructured ones like the situation in Malta) is to reduce accessibility to means of suicide. This strategy may work with other methods of suicide, like firearms and substance abuse, but is quite difficult to address in hanging. Considering that only basic and everyday tools are required for hanging (which many times result in asphyxia and not fatal spinal cord injury), it is quite difficult to reduce accessibility to the means. It is of no wonder that the method has been used for millennia and is increasing in popularity again.

Most suicides by hanging worldwide happen in private (Reisch et al., 2019). In Malta, 72.1% of hangings happened at home or in a private garage. This not only reduces the chance of physical intervention to stop the act, but also reduces the ability to prevent suicide by method restriction (Habenstein, Steffen, Bartsch, Michaud & Reisch, 2013). This may increase the method's lethality and reinforces the current ideas on suicide by hanging. Only those suicides which do not happen in private and are thus more accessible are in a way preventable through restricting the access to the means. In Malta, as in other countries, most of these happened in institutions including hospitals and prisons, where means including ligature and ropes may be easier to control, albeit not fully.

Another reason why hanging may have increased in popularity may be the perception that it is a quick method of death which is relatively painless and clean (Biddle et al.,

2010). It has always been known that hanging was a method of death with a high percentage of lethality, but lately this has been reinforced and refined. This has been brought about, in part, by internet sites providing more detailed information on suicide methods (Biddle et al. 2016).

As such, both the promotion of hanging as a quick form of death and the provision of more information has brought about more acceptance of hanging as a method of suicide (Kõlves et al., 2018). Both may be reasons why an increase in female use of this method has been reported internationally including in Malta.

Persons who died by suicide at an older age use jumping significantly more than hanging, as do females. Conversely, persons of the younger generation are more inclined to choose hanging as a method of death over jumping or other methods. This illustrates the point that the younger generation has accepted hanging more than other methods of suicide. Considering the small number of females who died by suicide, there could be no conclusive indication if there are gender differences within age groups.

In the coming years, as social acceptance of hanging continues to grow, early intervention strategies are required to prevent hanging from spreading further. Additional research is required in pre-action states of suicide, as traditional prevention techniques have proven to be ineffective.

On Jumping from Heights

Jumping to death from a height constitutes 25.3% of deaths by suicide in Malta in the period under review. This is higher when compared to the United Kingdom, where it is estimated to be around 5 % (Gunnell & Nowers, 1997), and to Austria, where 12 % of suicides are recorded to have happened by jumping off heights (Etzersdorfer, Voracek, Kapusta & Sonneck, 2005). It is, however, half or less than in countries in South East Asia like Hong Kong, where it rises to 46% (Law & Yip, 2008), or Singapore, where it reaches 72% (Chia, Chia, Ng, Tai, 2011). The rate in Malta is similar to that of Southern Italy (23%), which is geographically the closest to Malta (Pavia, Nicotera, Scaramuzza, &

Angelillo, 2005). Parallel to what was noted in Hong Kong, in Malta it is the elder generation that chooses jumping over other methods of suicide; 38.46% of suicides aged 75 and over (N = *10*) chose jumping as their method of suicide; 80% of these died by suicide at home or at their place of residence in an institution.

Statistics for the younger generation is somewhat perplexing but explainable in the Maltese context. Whereas 45.45% of those aged 22 to 35 who chose jumping as their method of suicide, died at home, older adults between 36 and 75 chose locations away from home, namely public areas, bastions, cliffs and bridges as their location of death.

Maltese young adults tend to stay longer at their parents' home. Many stay till they get married late in their twenties and early thirties. Many of the others who do not get married remain attached to the family home till later in life. This attachment to home and to a way of life where anything is provided by the parents may be one reason why persons who die by suicide within this age group opt to do this at home. It is their only known option, and thus a natural choice. This context is rapidly changing but still quite common in Malta. The choice to suicide at home may reflect a question of accessibility, as home is their only available location to jump to death in a relatively private manner when compared to other locations. Unlike Singapore, where jumping from home is attributed to an increase in population living in high rise buildings, in Malta buildings are typically two to four storeys high. This lack of height necessary to guarantee death does not seem to dishearten these persons from choosing to jump from a low building instead of securing death by jumping from a higher point. It may therefore mean that opting to jump to death at home is a choice made out of psychological necessity and not out of opportunity, as is reported to be the case in Singapore (Chia, Chia, Ng, Tai, 2011).

Of the outdoor locations away from home, the bastions were the most popular location for suicide by jumping (32.97%, *n=30*.) Considering that most of the bastions are several feet high (some over 200 feet high), they offer a high enough rise for the deadliest of falls into their ditches below. The second most popular location was Mosta bridge, where 10 persons jumped to their death within the period under review. The bridge is built over a deep valley and has a 154- foot drop.

The evidence seems to suggest that whether bastions or the Mosta bridge is chosen as the place of suicide is determined by the proximity of where the person resides and the place of suicide. Individuals who died by jumping off bastions were from the catchment area around the bastions namely the Northern and Southern Hourbour districts. In contrast 6 out of 10 individuals who jumped off the Mosta bridge resided in the Northern district. In both scenarios the choice of location could therefore be a question of accessibility and availability. The bastions are concentrated within the Northern and Southern Harbour districts, and Valletta in particular is very accessible to everyone as all public transport terminates in the city. The fact that Mosta bridge attracted people from the Northern district further strengthens the point that the choice of location may be influenced by accessibility and availability.

Persons completing suicide by jumping over the Mosta bridge were exclusevely older adults aged between 46 and 75, with the exception of one person within the 22 to 35 years age bracket. It is difficult to say if there are real gender differences, as 6 were males and 4 were females (spread over the same age groups).

The timing of the suicides by jumping may be an interesting study in itself for the future. It was noted that 16 persons died by jumping off the bastions in the morning. 13 of these suicides happenned between 05.45 and 09.00 hours. This means that nearly 42% of persons who died by suicide by jumping off heights did so early in the morning, before Valletta becomes busy with commuters. On the other hand, persons completing their suicide by jumping off the Mosta bridge were spread over all morning but mostly concentrated between 12.45 and 14.30 in the afternoon. There were no suicides recorded at the Mosta bridge in the evening or at night. The reasons could be various and could include the fact that the bridge area is mostly busy during the day. It could also be that as the area is not well lit in the evening and at night, it is more freightening for suicides to die in darkness. A preventive fence was installed late in 2016. The effects of such a barrier are not reflected in this study, but might be reflected in future research.

In general, a spike in mid-week cases of suicide by jumping was noted. Whereas the average daily rate of suicide by jumping off heights was 12.6% of all suicides the rate on Wednesday is double at 24.2%. Considering that most of the persons who died by

suicide by jumping off heights were of working age, this could be related to what was termed as "jobs stress" (Kposowa & D'Auria, 2010). This possibililty could have been explored had information about employment been collected, as indicated in the Investigative Support Tool.

As the information at hand is minimal, one cannot test for the differences in the profiles of persons opting to die by suicide at the different locations. This could be possible if and when the police collected all the information indicated in the Investigative Support Tool.

On Carbon Monoxide Poisoning

Only men were recorded to have died by carbon monoxide poisoning or deprivation of oxygen *(N = 9)*. Cases included the use of car exhaust as a means of inhaling carbon monoxide, and a case of deprivation of oxygen by burning gas in an airtight room. Six out of the nine reported suicides happened late in the evening or early at night. The mean age of the deceased was 41 ±14.31 (mean age ± SD, range 27 – 63). This reflects findings by Öström, Thorson and Eriksson (1996), who studied cases of carbon monoxide poisoning in Sweden. This research showed that 88% of deceased were males with an average age of 43 years ±15 (mean age ± SD, range 19-84). Statistics from other countries are very similar: in 2017, in Australia, 87.5% of those completing suicide by carbon monoxide poisoning were males compared to 12.5% females (ABS, 2019); In Denmark, between 1995 and 1999, 88.4% of those completing suicide in this manner were males compared to 11.6% females, and had an average age of 47 (Thomsen & Gregersen, 2006). There is, however, a difference in the national ratio of persons completing suicide by carbon monoxide poisoning. Whereas the rate in Malta is 2.5% of the total number of suicides, the rate in Denmark was reported to be 9.3% (Thomsen & Gregerson, 2006). The rate in New Zealand is as high as 18% (Taylor, 2010), and that in Australia decreased from 13.9% in 2009 to 5.6% in 2017 (ABS, 2019). This difference may lie in the perceived difficulty of finding the right spot where to die by the suicide in this manner. Malta has fewer open spaces with little forestry when compared to other countries. These are common settings for this kind of method of suicide in Europe and

elsewhere (Taylor, 2010). Moreover, since the country is densely populated, even the little rural landscape that remains is rarely devoid of people. This reduces the option of completing suicide in a vehicle hidden in the countryside, and constricts this method of suicide to confined spaces. It is perhaps the reason why the rate of suicides by carbon monoxide poisoning in a garage was much higher in Malta (at 66.7%) when compared to Denmark at 13.9% (Öström, et al., 1996).

This method of suicide has been associated with greater accessibility and higher use of vehicles (Öström et al., 1996). This may be true when one considers the difference in gender, as cars are usually used more by males than females (Sivak, 2013). This, however, contrasts with the general situation in Malta, where 613 cars per 1000 inhabitants are registered, making this one of the highest number of vehicles per capita registered in the European Union (Eurostat, 2017). Gender difference can also be explained by the fact that the method requires more technical skills, and by the female concern to choose quick and non-disfiguring methods of suicide (Lester, 1988).

An Evolutionary Development of Shame?

The majority of the suicides in Malta happened at home, in private garages or in private settings, mostly in the morning. These characteristics may be indicative of various factors amongst which are urgency, privacy and shame. Human beings, as animals, have naturally protected themselves during activities which expose their vulnerability and sought protection when they could be physically compromised. This could, over time, have developed into shame when doing these same things before others, but it primarily remains a protective evolutionary mechanism (Maccurdy, 1930).

A person who has decided to die by suicide has passed through many stages of contemplation. He or she would have overcome the guilt associated with completing such an act, but could still feel ashamed of deciding to do it. Shame has been constantly shown to be one of the most common themes in suicide notes (Foster, 2003). Shame is connected to privacy and conditioned by the social perception of what one ought to do and what one ought not to do. One, therefore, feels less ashamed in private than in

public, due to the lack of social pressure to act in ways which may not conform to expected behaviour. In a way, then, privacy is connected to shame as a means of avoiding social reactions which may inhibit the person from doing what he or she wants to do, particularly when those actions "ought not to be done". A violation of privacy when doing something that is stigmatised or not socially acceptable could be humiliating, as it can reverse what one wants to do to bring it in line with what one ought to do. It can thus be said that privacy and shame may be connected to the very identity of the individual, and thus it is natural to protect it (Austin, 2012). It may be generalised, then, that the higher the social pressure or stigma against any non-conforming behaviour, the higher are the chances that the same behaviour is manifested in private as opposed to in public, and in a protected environment as that gives more peace of mind, which is an evolutionary necessity.

Choosing to die in private, in one's own protected shelter (the home), may be a decision based along the same lines. The fact that a higher number of deaths by suicide have occurred in privacy and in a protective environment may be inversely indicative of the high stigma suicide still carries in Maltese society. The fact that hanging has been identified as the most common method of suicide continues to strengthen this. Hanging is a method of death more apt to be adopted in homes or garages, rather than outdoors because of the need of having some form of pivot.

In a way, considering that most suicides happened in the morning and considering how privacy and shame have been connected, one could hypothesise that dying by suicide in the morning indicates a sense of urgency to comprehend the actions necessary for suicide immediately at the start of a new day. This may be a form of protecting the difficult decision to die by suicide from being in any way reversed by other circumstances. In other ways, the sense of urgency may be associated with the need of holding the social pressure of non-conformance to the shortest possible time, hence the urgency to complete the required actions.

Is it a Question of Seasonality?

Data from various countries show a seasonal pattern in suicide, with a peak in spring and early summer (Preti, Miotto & De Coppi, 2000; Bjorksten, Bjerregaard & Kripke, 2005). This has been found to have existed from the 16th century (Ajdacic-Gross et al., 2005). In Malta, two peaks were noted: in March (11.1%, n=40), that is early spring, and in August (10.9%, n=39), that is summer in earnest. This is more in line with recent studies which show that in industrialised nations new peaks are being noted, thus bringing the term seasonality to denote periodic fluctuations rather than being bound by circannual seasonal phenomena (Adjacic-Gross et al., 2010). Some studies have attributed these changes to physical bioclimatic factors like sunshine, temperature and rainfall, and to chemical factors like level of pollen, pollutants, air particulate matter and other allergens which produce a biological reaction (Woo, Okusaga & Postolache, 2012).

Bioclimatic factors have been associated with suicide (Seregi et al., 2017), although researchers disagree about this association (Adjacic-Gross et. al., 2007). The bioclimatic factors most researched are sunshine, temperature and length of day.

The notion that sunshine is related to suicide has been explored since Durkheim and Morselli but research offers contradictory results. Some research found that outdoor workers, who were more exposed to sunshine than indoor workers, showed higher suicide rates (Koskinen et al., 2002), thus providing a direct link between exposure to sunshine and suicide. This view has been challenged by White, Azrael, Papadopoulos, Lambert and Miller (2015), who found that this association was non-significant and that it may have been used as a proxy for the association between seasonality and suicide. Other research linked sunshine with longer daylight associating this with suicide (Vyssoki et al., 2012). This in turn has been tied to changes in the bio-rhythm of the pineal gland (Parker & Walter, 1982) and to alteration in the serotonin production and transmission (Vyssoki et al., 2012; Preti et al., 2000), both of which have a role in mood control. This view has been challenged by Lambert, Reid, Kaye, Jennings and Esler (2002), who stated that, although serotonin levels correlated significantly with bright light, it was not related to the hours of sunlight.

Sunshine and daylight have a natural association with temperature. Studies conducted independently in Brazil and Turkey have found that higher temperatures are related to higher risk of suicide in males (Volpe, Tavares & Del Porto, 2008; Akkaya-Kalayci et al., 2017). At least one research work attributed this risk not to higher temperatures but to greater seasonal fluctuations, or what was termed as "spring-winter swing" (Chew & McCleary, 1995).

Other seasonal changes are related to pollutants and air particulate matter. Higher natural allergens like pollen in spring and pollutants like particulate matter are known to induce allergic inflammation, which has been associated with anxiety and reduced social interactions (Tonelli et al., 2009). Furthermore, without considering seasonality, studies from South Korea found a direct link between high pollution level and suicide (Kim et al. 2010).

All the factors indicated above correspond to the situation in Malta, and may provide a partial explanation as to why there are two peaks in suicide numbers in March and in August. March is the beginning of spring in Malta, and daylight would progressively get noticeably longer than the previous months, with an average daylight of seven hours (over December and January's average of 5 hours). March has a monthly average temperature of 14 degrees Celsius. August is the peak of summer with an average daylight of 12 hours and average temperature of 27 degrees Celsius. It is common to have temperatures as high as 37-40 degrees Celsius for several days in summer (Malta International Airport, 2019). August is typically a dry month, with high degrees of sand particulate from the Sahara even though the first rains may come later in the month. As for pollution; a higher concentration of particulate matter has been constantly recorded in August for the last years due to accumulation during summer, stagnant wind, and lack of rainfall during the month (Environment and Resources Authority, 2018). These changes between seasons is remarkable, and they create a notable seasonal swing in terms of what was reported by Chew & McCleary (1995).

Results have shown that the number of suicides in Malta is highest in summer (28.1%, n=101), followed closely by spring (27.6%, n=99), with a nearly 9 % drop in autumn (19.2%, n=69). Considering seasonality issues, in autumn Malta receives the first rains

after nearly 5 dry months; the air is cleaner, the country is greener, temperatures are less stifling and the average daylight is shorter than in spring and summer.

There may be other seasonal effects than weather and climate. The Maltese summer is characterised by constant outdoor activities including concerts, festivals and most importantly the weekly village *festas.* These could bear an effect on the psychological wellbeing of vulnerable persons who may find themselves trapped in the intensity of activities by their inability to participate which heightens their negative feelings especially if suffering from mental health issues like depression.

Summer is also the time where all school children are on holidays. Many families in Malta enjoy a summer residence, and those who do not, still enjoy many days at the beach or at sea. Many take their annual holiday in August (similar to the Italian *ferragosto*), especially on and around Santa Marija (a mid-August national holiday). These activities positively disrupt the routine for many. All this comes to a halt in the first week of September when the *festa* season comes to an end. Families return home and the school routine is adopted. October and November are two months in which no festivals or festivities are celebrated. There is no other long period during the year in which no national festivities are conducted. A simple consideration can be made here; The fact that the country seems to gear up into a routine just after a hectic summer may be an issue as to why the rate of suicide decreases for the following three months ([September 7.0%, n=25], [October 6.4%, n=23]and [November 5.8%, n=23]) until there is another routine disruption by Christmas preparations in December (8.6%, n=31) when the rate increases again. For many people, activites and holodays may seem to be positive. For others stability and routine are quite important.

The view that more activity may increase the risk of suicide is not novel. Durkheim (1951) had a sociological explanation when he reported that most suicides happen in spring. The season is associated with the awakening and the beginning of new life, of increased activity and with higher density of human interaction. This may be the reason of the peak in suicides in March and the other peak in suicides in August in Malta considering the very high activity of the summer month? The effect of seasonality, particularly if it is due to climate and weather changes or if it can also be associated with the activities celebrated during different seasons are interesting areas of future

research. These observations cannot be plainly considered as coincidental, but at the same time empirical conclusion cannot be made as yet. It is, therefore, logical to suggest that further research is required possibly integrating base date with a contextual application. Such research would provide a scientific explanation to seasonality and be of use in future suicide prevention initiatives.

Is Any Day Different from the Rest?

A study by Boo et al (2019) found that more suicides happen on Monday than on the other days. In Malta, weekdays are comparable and the percentage of suicides per day is very similar to the highest shown on Fridays (15.9%, n=57), which is followed closely by Wednesdays (15.6%, n=56) and Mondays (15.3%, n=55). The lowest number of suicides occurred on Thursdays (12.3%, n=44). An interesting factor noted in Malta was the spike of suicide by females on Thursdays and Fridays, which is nearly double the rate of the other days. It was also noted that the rate of suicide on Saturdays and Sundays (weekends) is somewhat lower (average 13.7%, n=98) than on weekdays (average 14.5%, n=261). It may be that future research resolves the answer as to why these discrepancies occur.

On the Choice of Time to Die

The choice of the time when to die by suicide may seem frivolous, as it may be the least of matters in the complexities of suicide, but there could be differences which, as yet, have not been studied and which can potentially be useful for preventive strategies. It was noted, as in other literature (Lukaschek, Baumert, Erazo, & Ladwig, 2014) that most suicides in Malta happenned in the morning, which was considered to be between 06.00 and 12.00 hours (35.3%, *n=125*).

The proportion of suicides slowly dwindles throughout the day, to the lowest percentage at night (15.3%, *n=54*). In Malta this trend, although visible in both sexes, is more pronounced in males, where a difference of 19.2% was shown between suicides

recorded in the morning and those at night. The proportional difference in females has been shown to be minimal at 1.7%. A difference in age has also been noted, in that in males, the proportion of suicides in the morning rises with age. This is only pronounced in females aged 75 years and over.

Similar findings were noted in Italy by Preti and Miotto (2001), and in Turkey (Doganay et al., 2003). These differences were attributed to the normal social and environmental changes that come with age and which affects males and females differently. Apart from these, there are biological factors which interplay with social changes and which may actually bring about the social changes one experiences with age. These too are gender specific. The realisation that one may not be as physically fit as when he or she were younger, the lessening of adventurous endeavours and similar matters may be biologically based but ones which bring about social and personal changes. These are many times disregarded and taken as part of the natural life cycle to which some, however, do not adjust.

It has been suggested that age brings about disruptions in serotonergic rhythm (Švob Štrac, Pivac, & Mück-Šeler, 2016) and hence the susceptibility of some persons to react to these changes with increased angst and a reduced capacity to manage new situations resulting in depressive episodes which are directly linked to suicide. The fluctuations may affect the same person differently throughout the day.

Part 2 – The Use of Data for Investigative Purposes

Timely and Accurate Data

The aim of this research, as that of any research related to suicide, is the better understanding of the subject which ultimately could prevent suicide. Accurate and reliable statistics are the foundation of any suicide prevention strategy, the basis of further research and a tool for psychologists, psychiatrists and other professionals to combat suicide. The effect of suicide is not only on the deceased but, on average, affects six other people (WHO, 2000). It is, therefore, natural to assume that suicide is a heavy

burden on the community, and that a price for each death is being paid. The economic price of suicide is high: a study in Australia estimated suicide cost to be around $6.7 billion per year (Kinchin & Doran, 2017). The sociological price is even higher, as it entails the very life of human beings.

Suicide is a dynamic subject, and trends and situations change over time. Suicide prevention depends upon "real-time" information. To avoid paying the high price of suicide, or at least minimise it, we need to reduce the number of persons who, each for their own reason, turn to suicide every year. "Suicide is not inevitable – it is preventable" (Samaritans, 2019 p.6): we need to reach more of those who are at risk by knowing what the actual risks are. This can be accomplished by having a better understanding of vulnerable groups, by collecting accurate information on suicides and by processing information in a timely manner. This, in essence, is what this thesis works towards. The need for sound collection of data, in the shortest possible way, is translated into the Investigative Support Tool (IST).

Underreporting and Misclassification

Research has shown that there is an element of underreporting and misclassification in suicide statistics (De Leo et al, 2010; Samaritans, 2019). This could have serious implications for policy development, as it may lead to mis-directed prevention strategies or intervention programmes, as well as postvention initiatives. One of the concerns regarding the issue of underreporting and misclassification encountered in this study is that since the police in Malta do not follow a standard protocol in reporting deaths; there is an element of improvisation on behalf of the officers. To a certain extent, this leaves the classification of death to the officer reporting on the case. In straightforward cases of suicide this could be less of an issue, but in cases which may either seem to be an accident or in cases where investigations are unclear or inconclusive, this may be important. Because suicide still carries a stigma for many, there could be a tendency to classify some cases as accidents or having inconclusive verdicts when, in actual fact, some deeper investigation could reveal that the person

would have died by suicide. This may be more pronounced in contexts dominated by strong cultural or religious taboos concerning suicide.

Two areas frequently reported in literature where misclassification is common are in single car or lone traffic accidents and in drug overdoses (Bohnert et al, 2013). This has been experienced directly in this study as well. For example; a case where a foreigner fell from a bridge onto an oncoming bus was reported as an accident because there was no immediate conclusive evidence that the person did not fall but jumped intentionally. In these cases, the investigation requires further effort and knowledge on suicide to collect specific information regarding the person's psychological profile and his or her intention of harming themselves and other related matters as indicated in the IST.

Suicide may be more difficult to prove in investigations where information is not as forthcoming. An undetermined verdict may be more common in methods of suicide which may be masked as other events, like drug overdoses. In these cases, more appreciation of suicide-related knowledge would be helpful to the investigator to establish the true nature of the case. For example, even though it does not impinge on the actual and factual details of the case being investigated, the fact that a person would have already attempted suicide in itself increases the likelihood of the case being a suicide. The fact alone does not constitute a verdict, but surely if one considers the many factors established in the IST and how each relate to each other and to suicide, it will help to ascertain the proper classification of death cases.

Collaboration Between Entities and Review of Cases

The investigative process of suicide in Malta is led by the police but involves the Magisterial inquiries and the state health authorities. All three entities record data on death for their own purposes. Bearing in mind that the police investigation and the Magisterial inquiry run parallel, and both are assisted by the state health authorities, most of the data is known to all three investigations. Other data which may be unknown to any of the parties would often remain undisclosed to the detriment of that party not privy of the particular information. It would, therefore, be expedient and efficient to

have a system where all the knowledge and investigations by different entities regarding deaths is shared within a timeframe. This could be particularly beneficial in reducing the number of cases with an inconclusive verdict. It would also bind all parties to hastening up their investigations. In practical terms, there are many times when an investigation can be stalled because of a lack of clear information on some matter. This can sometimes be found within the investigation of another department. It might, therefore, be more pragmatic to have an information-sharing platform for all departments to be more efficient in carrying out their obligations according to law.

The present study employed the full spectrum of information collected by the police as a central authority over the investigation of all the cases of suicide, and not just a sample. Having a system in which any other data held by different entities is included would additionally strengthen any future similar study.

Such a system could identify gaps in knowledge as well as serve as a base for reviewing all the cases of death to minimise under reporting and misclassification issues. The development of such a comprehensive system would complement the National Police System, and would result in a more robust statistical collection ability and function.

Such comprehensive and accurate statistics would enrich any development of a national suicide prevention programme, which is still lacking at the time of writing.

Valid and Reliable Data

Suicide data are used directly by policy makers including government entities in deciding on public health issues, including policies on suicide and suicide prevention. The validity and reliability of such data are thus of utmost importance. Only through such data can the scale of the suicide problem be understood.

The IST was formulated and is based on a literature review about suicide risk factors, precursors and variables that may affect a suicidal outcome. It is a broad and possibly comprehensive collection of what information and variables should be collected in order to have the most wide-ranging picture of suicide. This study employed the IST in coding the whole number of deaths by suicide in Malta over a 15-year period. Its

collection of what relevant demographic, psychological and social data is to be collated increases the validity of data collected through it as it is an accurate representation of the true nature of suicide.

Any information that is valid has a better chance of being reliable, particularly in a standard form as the IST. Such a standard form provides the necessary consistency to measure the same variables over time. This allows for monitoring of suicide trends, the tracking of changes in variables over time, and the provision of insights into suicide, as tested in this study.

If and when such a standardized tool be utilised by the police, it will minimise officer bias as to what information is recorded. This in itself is a measure which increases the validity and reliability of the information collected. It is also a measure that allows the police to focus the investigation and have a clearer verdict on suicide, as the outcome would be based on information that is reliable and relevant to suicide.

National Data vs Regional and International Data

This study has identified a statistically significant difference between the region of Gozo and the rest of the country. Even though one of the strengths of this study is that all the deaths by suicides in Malta were studied, the importance of regional data should not be neglected. The difference between Malta and Gozo as separate regions is testimony to the fact that regional differences, even in a small country like Malta, do exist and should not be overridden by national statistics.

Gozo has a lower rate of suicide per 100,000 inhabitants (Mean 1.7 deaths) against Malta (Mean 5.7 deaths). There may be various reasons why this is so. Gozo is a very closed and tight-knit community. Villages are very small, and most of them rural. The small communities are more homogenous than in Malta, and Gozo as a region still has particular socio-demographic characteristics of its own, particularly being more conservative than Malta. Roman Catholism is the religion of Gozitans and still has a strong grip over daily life. Foreigners are not as common as in Malta, except for British senior citizens expatriates who, for various reasons, retire in Gozo. The police are all

local, and are led as a quasi-Force of their own, with separate very small specialised squads including investigative services (Criminal Investigation Department) and forensic services. There are only two alternating duty Magistrates in Gozo, with a Court of their own separate from the Court in Malta. Employment trends in Gozo are different from Malta as the pool of resources is tighter.

It may be quite difficult to say if the lower rate of suicide is due to the characteristics mentioned above acting as protective factors, or if it is a question of these same characteristics increasing the stigma of suicide which may result in under reporting and misclassification of reports. The small size of the population (n = ± 31,000) could pose a reliability, problem as the rate per 100,000 is based on a third of its value.

In Gozo, only the three long standing methods of suicide were used: hanging, jumping and using a firearm. This could be related to social conservatism, meaning that new methods of suicide are not so readily accepted. Considering, however, that other methods, such as accidents, may be easier to mask, this could also be a question of misreporting or misclassification.

The suicide scenario in Gozo may still be of interest for it to be pursued in a separate study where all police reports of fatal and non-fatal accidents and deaths are re-visited to account for bias or misclassification. The number of deaths by suicides is too low (N = 8) to extract any tangible trends or changes, but this may change upon the re-examination of accident and other death cases.

A relatively Long Period of Review

The shift between hanging and jumping over the period under review was noted because of its relatively long period of examination. This importance has been found in literature and acknowledged by leading organisations working in the field of suicide prevention and assistance (Samaritans, 2019).

It is encouraging to note that the police in Malta have annotated more information with regards to suicide in the second half of the period under review (2010-2017), particularly in the last two years (2016-2017) when compared to the first half of the

period of review. This may be the result of more active police training in reporting, but may also reflect an increase in the appreciation of suicide issues. Even though there is no formal suicide prevention programme in Malta, there was still an increased effort to put forward the suicide agenda, and this may have had an effect.

The Investigative Support Tool would represent a substantial leap forward for the police, who could effectively be better positioned to collate an information base that is improved in both quality and quantity and consequently condition positively any suicide prevention programme. This could result in research of a similar nature to that detailed here in ten to fifteen years, which would produce a very clear picture of the suicide situation at that time, and provide a basis for the formulation for policy and practice revisions.

Part 3 – Impacts and Implications

Impacts

This study has acknowledged the multidimensionality of suicide. It has highlighted the need to consider every facet and variable affecting suicide not in isolation but as part of a network of relationships between these variables. Even though the different theoretical facets were acknowledged, it is evident that there are strong interactions between biological, psychological and sociological factors in suicide. This study was designed to seek out any factor that may affect suicide. The Investigative Support Tool is a collection of biological, psychological and sociological factors which are given equal importance as the intention behind the IST is to manage the best data collection strategy by collecting as much information on each and every recorded suicide. By having such a broad array of data, the study is an example for future research in seeking to find more relationships between different variables rather that the impact any one risk factor can have on suicide

The standardisation of data has been given paramount importance in this study. Such standardisation has been sought in epidemiological studies (Hawton & van Heeringen, 2000) because it increases the reliability and validity of data. This study can be

considered as taking a longitudinal approach which is more powerful to examine the different relationships between various variables. This is coupled with the fact that this research has studied all the reports of suicide within a realtively long period of 15 years

Having considerd variables from biological, psychological and sociological perspectives, the study has collated data that indicates or may indicat upon further study, the comorbidity of various mental illnesses and how different variables contribute differently when in combination with various factors, At this stage of research, it is imperative to know more on these relationships as it is these relationship which can indicate the dynamics behind a suicide.

Limitations

Any research has strengths but also limitations. This study is based on police records regarding reports of deaths classified by the police as suicide. This method of research of using pre-collected data from registers and databases has increased in recent years, and will continue to flourish as more data recorded in registers and databases worldwide are made available to researchers.

As with other research of a similar nature, one prime limitation this has is that data and its quality were defined by the records and not by the researcher. The police collected the data in their investigative role and not specifically to reach the aims and objectives of this study. As noted previously, data about suicide considered necessary or important in the current literature about the subject was unavailable as it was not collected by the police. It was noted that the police did not specifically collect, in particular, data regarding psychological factors of suicide like ideation and the transition to suicide. The lack of data in this area may have had an effect on the emergent picture of the nature and true characteristics of suicide in Malta, which was then based on the demographic variables which were more abundantly annotated by the police.

Another limitation of the data is that since it was extracted from the police reports it is difficult to know exactly how it was generated. This lack of control of what data was collected and how it was collected may impinge on the true quality of the data. Some data, for example, may have been collected from family members who were biased in

favour of the deceased or who wanted to withhold stigmatised information like mental health issues. A mitigating factor here is that the data were collected by police officers who are independent and not completely estranged from social sciences, even though they do not receive extensive training in suicidology.

The greatest limiting factor the data from the police reports had on this study was the fact that the police in Malta do not follow a standard operating procedure in their investigation of suicide nor do they follow a standard reporting structure. What data is collected is, therefore, bound to every officer's level of detail, and may be defined as an act of improvisation as there is no list of minimum requirements or of important details to be collected or what information is sought, nor what questions are to be asked and of whom. This results in great differences in the quality of reports that range from the mediocre to the detailed. Having no standard operating procedure impinges on the quality of the data collected. What is even more problematic is the fact that, the classification of every case of death is made by the officer taking the report together with the responding officer on site and there is no standard review of classification. This may have given rise to misclassification, particularly in some classes of death reports. The researcher has noted, in the course of this study, that some cases of suicide were misclassified particularly in three areas: reports of missing persons which later resulted to be suicide were still classified as missing person reports in the National Police System; reports of drug overdose where the motive would be established as having been suicidal are not changed to suicide (or attempted suicide) but left as a drug report; and cases masked as accidents, particularly where an uncommon method of suicide was used, are not reclassified as suicide even when such a verdict is reached through an investigation.

The question of classification is also bound to the fact that cases are classified as suicide based on the officers' basic knowledge of the subject, and not classified according to the International Classification of Diseases (ICD) by the police.

The validity of the information gathered by the police has two dimensions: the completeness of the database (i.e.: whether all relevant cases are included) and completeness of variables (i.e.: whether all relevant data is recorded in each case). Whereas the completeness of the database is a positive outcome for this study as it

employs all the relative cases identified as suicide, the completeness of variables may have an effect on the overall validity of the outcome as this is not as complete as one would have required for this study. Validity is important, as it may impinge on the predictive value of the information. To avoid having invalid predictive data, this research was limited to crosstabulations and - where possible - a multinomial regression and a difference of two proportions test were employed. This may have limited the study, by limiting statistical deployment, but as all possible data available was included in this study, this could not be done in any other way.

Theoretical Implications

Despite all these years of research on suicide, our understanding of the process of suicide is still tenuous. This has been attributed to a fractured approach in research, particularly in the study of how a person progresses from suicidal ideation to an actual attempt (Klosky & May, 2015; Klonsky, May & Saffer, 2016). More effective collation of more reliable data has been identified by the same authors as being a key requirement for future research, in order to further understanding of when and why individuals transit from ideation to suicide. These concerns are addressed in this study, as it not only provides real-life information on suicide in Malta but - more importantly - it provides a single platform for the collection of a multitude of data on persons dying by suicide through the proposed IST. This should assist in consolidating and addressing the question of fragmentation of suicide data. What Klonsky and May suggested in their Three Step Theory (3ST) is for valid information on the four core themes of the theory, that is pain, hopelessness, connectedness and capacity, to be properly collected (Klonsky & May, 2015). This compliments their idea of evidence-based risk assessment, suicide prevention and suicide intervention. These concepts are taken up in this study as, both conceptually and in actuality, this is a study of real-life information collected through an evidence-based data collection tool constructed using documented evidence from literature.

Our lack of clear understanding of the dynamics of suicide has led many to believe that knowledge to prevent death by suicide is acquired by studying proxy measures such as ccess to suicide means or by conducting, research on those who survive a suicide

attempt. This could hamper theory testing as concept validity and reliability cannot be tested in this manner (Horton et al., 2016). Moreover, research has shown that there are different contributing variables for persons engaging in different suicidal behaviours (Dhingra et al., 2015; Taliaferro & Muehlenkamp, 2013). The concept of this study is based on the investigation of deaths by suicide only. It is therefore a direct study on suicide and provides and promotes the idea of separating the study of those who die by suicide from those who attempt suicide. This is a theoretical and practical development in line with what Klonsky and May (2015) proposed in their 3ST theory, and further endorsed by Quinn, (2016) and Kleiman et al., (2017).

Other theories falling within the ideation to action model, including the Integrated Motivational-Volition Model and the Fluid Vulnerability Theory mentioned earlier, are designed to direct the study of suicide away from focusing on risk factors to a study of the processes and interactions these risk factors have in the lead up to suicide. It is proposed that to obtain that insight, there is a need for the collection of comprehensive information on each person dying by suicide. The present study takes a different approach to what is mostly practiced today, whereby most of the information is collected through medical and clinical assessments. If aptly guided, police sources could prove to be a rich and reliable source of information and knowledge to inform further theoretical developments. Rather than clinically seeking how many individuals manifest any one particular risk factor, this study takes the approach of collecting comprehensive information on each individual who died by suicide to then seek which risk factors are manifested in the whole community under study. The IST could prove to be a useful tool contributing to the theoretical lineage of the ideation to action models, by providing a platform to collect that required comprehensive information.

This study, which uses a cross sectional observational design, was to a large degree, by the limited amount of data collected by the police. The proposed IST as a standardised form to gather more accurate data could prove to be the right tool by which this study can be replicated to provide substantially more valid and reliable data. It can also be conducted in a retrospective cohort observational design in the future, as there would be enough information to analyse risk factors and calculate relative risk, and would thus enable the measurement of theoretical constructs in a temporal sequence to give

strength to theory. This was conceptualised by both Perez et al. (2017) and Keefner and Stenvig (2020) as an important step in re-thinking how future suicide research should examine the relationship between the factors indicated by Klonsky and May. It should also be considered that this could only be done through observational studies as no randomised clinical trials can be conducted in studies of deaths by suicide (Mariani & Pêgo-Fernandes, 2014).

Observational studies usually aim to draw out generalised themes on a subject and follow a phenomenological pathway; that is - through such a study as this one, the researcher seeks to measure real-life situations in a heterogeneous manner which is closer to clinical practice (Yang et al., 2010). This is what the present study sought to achieve. Even though such studies are rarely theoretically driven, (Van Orden et al., 2010), their importance is their contribution of fresh knowledge crucial for the sustainability of theories. In this manner, the present study is contributing to the sustainability of theories such as Klonsky and May's Three Step theory and other ideation to action models which are directed towards obtaining "real-life" knowledge, by providing much required data on the Maltese context. Some elements of the proposed IST further address some of the limitations indicated previously, such as the lack of emphasis on secondary risk factors and protective factors like social contact, quality family time and the effect of the extended family and social circles (Meyer et al., 2017).

This study has focused on the investigation of suicide as conducted by the police in Malta to extract a profile of suicide in the Maltese islands and examine what information the police actually collect when compared to that which the literature would posit as important to collect. The use of police data for psychological studies has previously been limited to extracting information from police databases. The police are often in a position to collect rich data. The present study addresses this potential by proactively proposing what kind of data the police should gather with regards to suicide. Some of the information that is suggested to be important may not be directly linked to police investigations but may be important for psychological studies. More extensive and robust data could be collected by the police through the use of the Investigative Support

Tool presented here, which could, when collected, prove invaluable when conducting psychological autopsies.

Further to this, the proposed Investigative Support Tool contributes to the psychological autopsy technique as it streamlines the way data, which could later be made available for psychological autopsies, is collected at source. One of the limitations of this study was the low frequency of annotation by the police on many of the variables required to extract a complete picture of suicide in the Maltese islands. This study lays the foundation for future studies, as such limitations could be circumvented if the proposed Investigative Support Tool is adopted by the police. It would also mean that any psychological autopsies performed in relation to suicide cases would have access to richer data than was previously the case.

The Investigative Support Tool, which is based on the psychological autopsy technique, provides evidence of the technique's investigative strength. This is done by focusing on the analytical contribution the police can make to psychological studies and to forensic analysis of death as a science. The use of the Investigative Support Tool is also a form of investigative contribution to forensic autopsies as a body of knowledge for medico-legal investigations. Police investigations usually have broader terms of reference than forensic autopsies, which are a stricter medico-legal exercise. For example, whilst the aim of a forensic autopsy is to establish the cause of death, the aim of police investigations is to go beyond that and establish the manner and circumstances of death. Medico-legal investigations such as Magisterial inquests or their equivalent coroner's investigation benefit from the broader knowledge gained through police investigations. The Investigative Support Tool can thus be considered as a contribution to the theoretical development of procedures within the medico-legal field, as it enhances both the quality and quantity of information the police can provide through their broader investigations into the stricter medico-legal examination process.

Standardisation of data has been noted to be one of the solutions for the better interoperability of different professions working with people who attempt or die by suicide (Emergency Nursing Resources Development Committee, 2012). This study provides objective data from the police for different professions to interpret. One of the major obstacles in interoperability is the interpretation and definition of variables. This

study contributes a standard data collection tool which could serve as a basis for a common definition of many variables, thus addressing issues of interoperability. One the recommendations made in this thesis is the need for an inter-agency review of suicide reports on a national level. This study could serve as the theoretical basis for such a recommendation, which would enhance the national agencies' capacity to formulate a national suicide preventive strategy and record and test the effectiveness and efficacy of intervention strategies over set periods of time.

As already described in previous chapters, recent suicide research has developed an integrational attitude towards theories and contributions promoted from different fields of study, much in the same way as multidimensionality has been given its due importance. The present work demonstrates that the study of suicide is not an exclusive realm of any one profession, be it psychiatry, psychology or sociology. Rather, the study of suicide is an area where various entities and professions should collaborate to provide integrated solutions to an overwhelmingly complex problem. The present study has contributed to the theoretical development of such an approach by collating risk factors of suicide identified by psychiatrists with others identified by psychologists and sociologists into a tool to be used by a profession that is not made up of psychiatrists, psychologists or sociologists. The Investigative Support Tool was created with material provided by these three areas of study to assist the police in contributing to the study of suicide by providing data which could not be obtained or could not be obtained easily from other sources. The present work is thus a theoretical proposition of how professions can work together to enhance understanding and knowledge in the area of suicidology.

In itself, this is a theoretical contribution to various theories within the sociological framework, the ideation action models and to the public health approach. Recent theories of suicide, including the Interpersonal Theory of Suicide, the Integrated Motivational-Volitional Model and Three Step Theory as well as the Public Health Approach, call for an integrated methodology. These theories are essentially built on the classification and characterisation of what behaviours manifest at different stages of the suicide process, but do not stop at looking at separate stages but as a whole process. The public health approach gives an even broader dimension to these theories, by

emphasising communal responsibility surrounding suicide. This study contributes to this integrated approach by promoting the idea that it is essential to collect the broadest spectrum of data possible to be able to analyse suicide in such a manner. The study did not focus on any singular approach to suicide by collecting data to satisfy the needs of one theorical approach but rather took a multidimensional approach by incorporating as much data as possible as a contribution to the integrational approach to suicide.

Practical Implications

The aims and objectives of this study revolved around the importance of collecting data on suicide in an appropriate manner for the benefit of the police but also for the benefit and for the development of multi-agency and public health approaches to tacklng suicide. The implications of this study are naturally borne of the same matter and emphasise the importance of this.

The greatest impact this study has is that, through the Investigative Supposrt Tool, more data on various aspects of suicide could be generated. This advantage is two-fold as it has a specific benefit to Malta and a generic benefit to suicidology. The specific benefit for Malta is that, through the IST, data on all suicides happening in the country in the near future may be collected. This could mean that the nation could generate a very detailed profile of suicide which can be utilised in the many ways already explained. The number of suicides happening in Malta are and will be limited. However, albeit that frequencies of occurance are small, the sample would be whole and it would thus mitigate some of the limitations outlined in this study particularly those which came about due to missing data.

The generic benefit to suicidology is that usually untapped, rich police data could become, through the adoption of the IST, a useful source of knowledge for psychological autopsies in cases of suicide. The importance of such an established field of study has already been shown. The methodology employed here is built on such a framework and the IST is designed to make the process of collecting data for psychological autopsies simpler for police officers. The advantage of having a straightforward form in gathering

data is that it increases the chances that police officers would register more information required outside their investigations but which could ultimately be useful for a psychological autopsy. By providing a clear coding framework, such a tool would also reduse the risk of bias and misinformation. As already seen, the fact that data is collected in a standard format makes it easier to be utilised by other professions. As such, one of the recommendations made is the development of an inter-agency review of suicide reports where this implication takes higher precedence in its importance.

This study focused on the police and as such implied that the study of suicide is not an exclusive domain of the medical professions particularly those the mental health sector. Recent meta-analyses like Nielssen, Wallace and Large (2017) suggest that the study of suicide should not depend wholly on psychiatric and psychological analysis. In addition to mental disorders, variables incorporated in the IST included other economic, educational, social and family factors which have all been shown to influence suicide but which, are often overlooked due to this reliance on psychiatric and psychological variables. Suicide may be more of a community problem and putting the responsibility of prevention solely on the healthcare professions may have discouraged the wider participation of the public. This study seeks to change this by broadening perspectives to highlight the primary contributory role the police could have in enhancing science and knowledge regarding suicide. It could diffuse the burden put on psychiatrists and other mental health professions that it is their sole responsibility to provide appropriate treatment to prevent suicide. In the event of suicide by a person who is admitted to a mental health clinic, the psychiatrist is blamed for not predicting suicide whilst if the same person had to be refused admission, the psychiatrist would be blamed for not doing enough. Such beliefs are unjust on mental health professionals and downplay the communal responsibility and the role that we all have play in preventing suicide.

Practical Implications for the Police

The police are in a unique position to collect data on suicide. The police in Malta are the only entity, entrusted by law, to investigate all cases of death. It is, therefore, natural that the MPF gathers, processes and holds so much information that one of the greatest

contributions the police force can make to the study of suicide in Malta is the collection and processing of primary data *a tempo vergine.* Such data is invaluable, as it is collected by an independent body for purposes which do not conflict with any professional study or field. Most importantly, much of the data is collected just after the death is discovered, when people, especially close relatives and family of the deceased, tend to be prompt due to the solemnity of the moment.

The Investigative Support Tool (IST) proposed in this study would have a positive effect on the daily operation of the police in Malta in multiple ways. It would be the first time that suicide would be investigated using a standard empirically-based tool which would guide our officers to collect relevant data which can be utilised in the investigation and beyond. Using a standardised format of data collection would establish a minimum level of data to be collected which presently does not exist. It removes the element of improvisation in investigations and bolsters the focus on what data is relevant for an investigation.

A standard procedure of data collection would guide the investigation process and would reduce mis-reporting and mis-classification of suicide. The obvious advantage of having such sound data is the increased reliability and validity of investigations and the reported data. It has been noted elsewhere in this study that there may be a percentage of suicide cases that are mis-classified as drug overdose in cases of substance abuse or accident in cases of voluntary traffic accidents. One of the main reasons for such mis-classification is that certain cases may not be as clear-cut as others. With a standard tool such as the IST, officers would be guided as to what to look for to determine if an ambiguous "accident" might actually be a suicide.

The process of utilising the IST by the police requires minimal training as the proforma is quite straight forward and simple to fill in. Most of the data may be collected at the location of suicide from those in attendance, including close family, other relatives and friends. Such a ready-made form would be of assistance to police officers in gathering the required data in a quicker more efficient way but its main strength lies in collecting standard data on suicide which is readily comparable with data form other sources.

The IST itself can serve as a basis for obtaining information from sources other than police investigations. It can be utilised as a framework for structured interviews with family, relatives, friends and acquaintances where these are necessary. One should bear in mind, however, that police officers are not trained psychologists and should not take the role as psychologists within a psychological autopsy framework. The IST was created to assist the police in gathering as much information within their remit that could possibly be combined with data from other professions like healthcare, in building a descriptive profile of suicide.

The same idea of the IST could be adopted by the police in other areas of interest particularly areas where a descriptive profile of an individual may be required. Descriptive analyses, such as those produced through the IST, are very important for the police in situations where the need to create a profile of a person is urgent such as in the investigations of missing persons. Such profiles can only be created successfully if they are based on a broad array of attributes and variables such as presented in the IST. Unfortunately, such investigations are conducted without clear knowledge of the missing person's character and without reliable indications as to what might have happened or where the missing person might have gone. In building a profile of a missing person, the police would be able to conduct a behavioural analysis which could project how a missing person might behave in particular situations and possibly anticipate what could happen and where to trace the person. Such data could be beneficial in focusing the resources required by the police, civil protection department and other entities in co-ordinating the search and rescue operation of the missing person. Apart from utilising the available but often stretched resources of these departments, such data could increase the chances of finding the missing person on time and in good health. A secondary benefit of collecting such information is that the police would have data that could be utilised in subsequent incidents of the same person going missing. This same data can also be further utilised to update the "profiling" capacity which ultimately would result in devising better responses.

Missing persons investigations may be linked to suicide and therefore the importance of collecting reliable and robust data is increased. A very small percentage of missing person reports result in suicide but sometimes suicides result in missing persons report

as the body of a person who would have died by suicide is not located. Data collected in the manner proposed by this study could - in cases of missing persons - produce possible scenarios, each based on common outcomes from statistics. One such scenario in missing persons investigations could be related to the risk of suicide. A method of doing this could be by looking at differences in the behaviours of pre-determined groups. This may only be formulated if enough data is collected which, at the same time, increases the confidence level from derived statistics. The IST or a similar form is one sure way of creating a framework for reliable data collectiom.

In the same manner as the IST could be used in the investigation of missing persons' reports, it could be utilised as a field data collection tool for criminal intelligence and data collection. The IST could be adapted to incorporate other required data but the basic concept of how data is collected remains intact. Data collected in such a manner can be incorporated into larger integrated systems of criminal intelligence with potentially very valuable results.

One last but important practical implication this study may have for the police in Malta is the raising of awareness of suicidal behaviour and suicide risk factors. Police officers meet a considerable number of people every day and as such officers can act as gatekeepers of suicide. Apart from the practical inference that a trained police officer may notice any unusual behaviour or suicidal risk in the community, it is also beneficial in supporting family members, relatives or friends of people showing suicidal behaviour to make them aware of such behaviour and to assist them in taking the necessary actions. This is also true when suicidal behaviour is displayed by a fellow officer. Knowing the signs of suicide is a first aid tool to intervene and assist the person in receiving professional assistance is do required.

Practical Implications for the Healthcare Professions

One of the aims of this study was to produce a snapshot of the current situation with regards to suicide in Malta. This was not done just for the sake of having a profile but to serve as a benchmark against which data is compared in order to assess which persons

may be at risk of suicide. Suicide risk assessments are based upon obtaining a broad array of data on the individual under examination much in the same way as this study was conducted. It is, therefore, natural that the same method of discovery used in this study can be utilised in health settings particularly in the formulation of risk. Risk is measured by calculating the difference between the actual data and the average or expected data. This study has produced a series of what can be considered as average or expected data within the context of suicide in Malta by collecting all the possible information and by proposing a system whereby most of the relevant data could be collected in the near future to enable better alignment with requirements and professional standards. In this way, it has the potential of being a useful tool in the calculation of suicide risk by providing comprehensive data on suicide factors which could be utilised as the comparison benchmark in suicide risk assessment.

Ancillary to the collection of data, the IST has the potential to serve as a basis for controlled or structured interviews conducted by health care professionals to obtain further information on patients from patients themselves, their family, other relatives and friends. Apart from being used in the suicide risk assessment on the person, this may be utilised in the formulation of health care plans including scheduling of leave from an institution, adjusting of independent hours and similar mechanisms.

The IST and structured interviews can be utilised by healthcare professionals, possibly in conjunction with other entities including the police as part of a co-ordinated postvention response in the aftermath of a suicide. This facilitates healing and brings closure to those grieving by mitigating the negative effects of being exposed to suicide. In themselves, such measures can be considered as future prevention since persons exposed to suicide are themselves at a higher risk of suicide (Hill et al. 2020).

More reliable data collection, facilitated through the use of the IST, might also be utilised within a health promotion setting. Data on variables such as family support, spirituality and religion and similar factors which could be considered as protective variables of suicide could all serve as the basis of targeted public health interventions. They could also be used in developing suicide prevention programmes. This public health approach would serve the broader role of the health services in promoting a healthier life and addressing unhealthy habits.

The study can also serve to encourage health service providers to implement an evidence-based approach and as a foundation in the identification of the required training and resources for health care professionals in the area of suicide. The study highlighted out some elements which would require attention and interpretation from the health care professions like for example the spike in suicide numbers in March and August, the difference in the time between male and female suicide and similar models. Analysing and interpretating the data from a health care point of view could give insight into the phenomenon of suicide which ultimately be beneficial in focusing field resources and training requirements. This process would also be enhanced if and when a standard data collection tool such as the IST is used as the result would ultimately be an increase in descriptive and predictive data. The benefits of such a data driven approach are many as it can indicate how to formulate the right training, improve practices where necessary and tailor the training to the particular needs of the system.

A Public Health Approach to Suicide

Suicide has become a public health priority due to the increased burden on society which can no longer be ignored (WHO, 2018). In response to an ever-growing body of research injecting knowledge on suicide from various fields of study, a public health approach to suicide has recently developed. The basis of this approach is the idea that suicide is a communal responsibility and therefore, it is incumbent on everyone to prevent it from happening (Hoven et al., 2009). This study can have a positive implication in this regard as it increases awareness on suicide and the understanding of underlying psychological and sociological conditions of persons contemplating suicide. This is important as such knowledge and understanding sensitise the common public to suicidal behaviour. As a public health concern, there is a need for the general public to be able to note particular behaviours manifested prior to suicide as this could provide for a successful intervention.

This study also empowers the police, an organisation dedicated to assist the public, in being of service to the general public health approach toward suicide by providing

much required data. A public health approach already had a positive impact on the public attitude towards smoking and automobile safety to name but a few. It has also been recently considered in prevention programmes in other areas relating to general crime and violence prevention (Middleton, 2013), in youth violence and offending (Shori & Scantlebury, 2019) and child mistreatment (Malvaso et al., 2020).

Other General Implications

On a more general note, this study has a two-fold implication. Whilst it generates more data, it raises the awareness of suicide in Malta. This study puts the subject of suicide on the national agenda and hopes that apart from the generation of general awareness on suicide, it highlights the need for the common public to be aware of suicidality and suicidal behaviour. In increasing the public knowledge of risk factors for suicide and the warning signs of suicidal behaviour, society at large would increase its preparedness to support and respond to suicidal members of the community especially by intervening in times of crisis. This should prove to be a protective factor against suicide and therefore commendable in the long-term prevention of suicide.

The study can be utilised as an educational tool for the general public. The awareness it raises may be sustained by providing the results and presenting them in an informative and educational manner. One strength of this study is that results are local. This could have the effect of people acknowledging and identifying themselves better with the study than having results from other countries translated into a Maltese context. Education about suicide and its effect can also be considered as a prevention measure.

General appreciation of factors associated to suicide would also reduce the stigma of the subject and indirectly of mental illnesses that are intimately associated to suicide. Apart from having a direct impact on the wellbeing of individuals, stigma impacts the functioning of society at large by creating rifts and gaps between community members. More social awareness on suicide would also be beneficial for the community to provide support to those dealing with a suicide loss.

The generation of data and the ability to enhance it by utilising the IST is an important implication. As more data is generated, the better would our understanding of the local aspects of suicide be. This would naturally result in a better response in procuring and offering better treatment for suicidal members of the community with focused intervention and services.

This evidence-based approach should spur policy makers in acknowledging the urgency of a national suicide prevention programme based on the knowledge we now have of the current situation and how this has changed over the past years and how it is projected to change in the coming years.

In 1974, Meilak, Cassar and Grech published the first known study on suicide in Malta. It was also the last. This study built on their idea of taking a snapshot of the current situation regarding suicide in Malta by utilising the framework of the psychological autopsy to collect data on each suicide and presenting a tool by which not only the process to collect data is made simpler for police officers but may also be utilised by other professionals. In this manner, this study is an important step in any evidence-based effort in suicide prevention policy, particularly for the assessment and prioritisation of required interventions, training and for the allocation of resources.

Recommendations

This study may be seen as a seminal work on suicide in Malta. Further empirical investigations are required. Every area of study may offer new opportunities in building our knowledge of suicide in the Maltese islands. There may be various approaches to take. Listed below are some of these.

Recommendations for Future Research

Study the differences noted between Malta and Gozo

A statistically significant difference in suicide between Malta and Gozo as separate regions was noted. Further investigations are required to establish, firstly, whether the difference is real or if it can be attributed to misclassification or underreporting, and, secondly, if the difference is real, to establish what the differences are and why they exist.

Study further the positive and protective effect of family and close community

This study has been limited in showing the positive effect of family and how living in a community that cares can have a strong protective effect. The findings in this study are limited due to the lack of information available to the researcher in terms of police reports. Further studies are required in the field considering that, even though Malta is fast morphing into a cosmopolitan hub, family and friends can rarely be far away in this restricted geographical area.

Study the effect of overcrowding, dense population and urbanisation

Malta has had a long history of dense population. In the last years, however, being densely populated turned to overcrowding, particularly in the Northern Harbour district. This will surely have an effect on suicide that we need to study. Urbanisation, on the other hand, is sprawling within traditionally rural areas like Mosta, Haz-Zebbug and Haz-Zabbar. A hybrid generation of quasi-rural people, having links to farming, animal husbandry and the like, is now living in quasi urbanised settings within the traditionally non-urbanised areas. The study of such demographic developments has become

necessary to establish the effects urbanisation is having on the Maltese way of life and how this is changing.

Study the effect of common health problems, like high blood pressure and diabetes, on suicide

Malta has for, the last years, reported numbers of people suffering from chronic diseases, particularly diabetes and hypertension, that are above the European average. Both may be linked to suicide. A study of the relationship between chronic diseases and suicide in the Maltese context is required to understand the effect they may have on each other. Such a study is important, considering that both diabetes and hypertension are major health concerns on the islands.

Recommendations to the Malta Police Force

Adoption of the Investigative Support Tool or similar

The Investigative Support Tool was designed specifically for the investigation of suicide and hence is a tailor-made tool for the police. This study has shown that only a third of what has been deemed as necessary data is being collected by the police. With the use of the IST, this proportion would be much higher. Apart from the standard of detail, the quality and quantity of data that would potentially be collected by the police is substantial. Moreover, it is likely to be more efficient for the police officers investigating a suicide to have all the information in one form. The IST will also enhance the reporting standard of the Force.

Review all case of missing persons, deaths, drug overdoses and accidents

All investigations are reported to higher superiors within the police force. This serves as a form of review. However, it is suggested that in cases of death reports, drug overdoses and fatal and non-fatal accidents, a deeper and specific review is made in order to establish or change the classification a report is initially given. It was noted, as already explained, that some cases which are initiated under one category may keep the original classification even if this is established to be different after investigations. This is creating misclassification and possibly under-reporting of suicide, as the subject is still stigmatised.

Be the leaders is a data collection and research

The police have the advantage of being the sole agency entrusted by law to investigate all cases of deaths, serious injury and any other report in which human life may be injeopardy. The police are the first responders in many situations. In Malta, the police are still a relatively trusted authority and, as such, the Force should use this authority to the advantage of the community it serves by being a leader in data collection and research. The police possess unique data which can be utilised for future research, not just for criminological studies (as many times happen today) but also, as this study has proven, for other empirical studies.

Train the police to notice behaviours from ideation to action

The police interact with a good portion of the population on a daily basis. The people who require assistance because of their suicidal thoughts or tendencies come to our police stations and meet our patrol officers on the streets. It is recommended that the police receive special training on suicidal ideation, behaviour and actions, not just to

have the capacity to investigate reports or to obtain data for their investigation, but also - and more importantly - to sense and prevent suicide attempts before they happen.

Increase patrols in suicide hot spots by officers specifically trained in suicide negotiation

The increased presence of police officers in areas known as hot spots for suicide would likely be of benefit, as they serve to increase the likelihood of interaction with any person contemplating to attempt suicide. What is being recommended further is to have patrol officers in these hotspots specifically trained in suicidal-behaviour-awareness, and - most importantly - negotiation skills, to handle emergencies when anyone happens to attempt.

Spur the authorities and be the leaders in setting out a national suicide prevention strategy

It is the duty of the police to protect the well-being of society, to prevent anything that may destabilise it, and to protect life. It is therefore well within the police remit to spur the authorities to set up a national suicide prevention strategy, which has been discussed for many years now. Such a comprehensive strategy could channel necessary resources in a prioritised manner. This study may be a starting contribution to this as it sets out the nature and characteristics of suicide in Malta.

Other recommendations

Inter-agency review of suicide reports

Important information about each person who has died by suicide may be held by various agencies who are entrusted to either investigate the suicide after it happens or

who happen to have offered a service to the deceased or held other records. Records held by mental health care units and hospitals, employment authorities and other such agencies may have data that define the personal profile of each suicide. It is recommended that an inter-agency mechanism be set up to review all cases of suicides and collate, or rather fill, in all the necessary information on each person completing suicide to have a complete profile. Having sound data over a long period of time would ultimately serve to have an empirically based complete profile of suicide in the Maltese islands.

Interventions to reduce suicides at hotspots

Three main hotspots for suicide by jumping were identified through this study; the areas were common knowledge, but the general perception seems to be that most suicides by jumping happened at Dingli Cliffs and not over the bastions of Valletta in particular. The third hot spot is the Mosta bridge, as explained earlier. A direct intervention has already been taken at Mosta bridge, by installing a fence over the bridge itself. Its effectiveness could not be calculated in this study, as this was installed just before the end of the reviewed period. Direct intervention by fencing at Dingli Cliffs and the Valletta Bastions may be trickier, due to the landscape and high historic value. However, restricting access to some areas is recommended. Secondly, at the three hotspots, the placement of assistance boards or signs would encourage help-seeking by individuals who would be about to attempt suicide. Thirdly, by the use of current technology, remote surveillance could be utilised and trained officers dispatched whenever a person is noted to have shown suicidal behaviour. Together with this, the police may increase patrols in known areas of the Valletta bastions, especially early in the morning as indicated in this study.

Conclusion

The need to distinguish between types of suicide, between characteristics of suicide, and between varieties of suicide predates our scientific age (Barbagli, 2015). Suicide has a plurality of causes, and varies between groups and cultures and over time. It is affected by various causes and events. In simple terms, it is a dynamic phenomenon which affects millions of people worldwide.

Suicide is not inevitable, but it is preventable. The study of suicide, the monitoring of trends, and the knowledge of its characteristics are key to understanding who is at risk and how we can prevent it (Samaritans, 2019).

This study is a small contribution towards the prevention of suicide. It is a local study based on all the data available on death by suicide within a 15-year period in Malta. It has, however, the potential of offering something fresh to an apprised investigation of suicide by means of its proposed Investigative Support Tool. If adopted, the IST will bear fruit in the near future when data for a long enough period can be assessed and a fresh profile of suicide in this island nation extracted. Bearing in mind the amount of detailed information that the IST would potentially generate, a future profile of suicide would have a greater level of detail and reliability. Such a profile, as the one traced through this study, could be the basis of a preventive policy, which would possibly be more effective as it would have been built on reliable evidence.

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Appendix 1 – The Variables - A Coding Dictionary

SPSS	Variable	Variable Title	Class
1	Variable 1	**Date of Birth and Age** The date of birth and the chronological age of the deceased at time of death were entered as figures for SPSS purposes	**D***
2	Variable 2	**Gender** 1 denoted male and 2 denoted female	**D**
3	Variable 3	**Sexual Orientation** 1 denoted heterosexual orientation, 2 denoted homosexual (lesbian and gay) bi-sexual or transsexual, inquiring or queer	**D**
4	Variable 4	**Race** 1 denoted Europeans, 2 Africans, 3 Asians, 4 Arabs and 5 referred to any other race	**D**
5	Variable 5	**Nationality** 1 denoted Maltese nationals, 2 denoted Foreigners. The nationality of foreigners was also recorded in each case	**D**

6	Variable 6	**Immigration Status**	**D**
		1 denoted country nationals, 2 denoted naturalised nationals, 3 irregular immigrants and 4 regular immigrants and visitors	
7	Variable 7	**Marital Status**	**D**
		Originally 1 denoted a person who never married and 2 denoted other 'single' persons. 3 denoted married persons, 4 denoted persons who divorced or whose marriage was annulled. 5 denoted persons who were in a relationship and 6 denoted persons who had any other marital status. This variable was streamlined by combining categories 1 and 2 to have 1 read 'Single' . Categories 3 and 4 were combined to have 2 read 'Married or in a relationship', The denotation of divorced persons and others who had their marriage annulled was changed to 3. Since persons who fit into category 6 (other status) were all widowed persons, this category was replaced by a new category, 4, denoting 'widowed' persons.	
8	Variable 8	**Residence**	**D**
		The place of residence of the deceased at time of death was recorded according to LAU 2 (See Table 9 of Results Chapter 2 – The nature of Suicide in Malta)	

9	Variable 9	**Religion** 1 denoted Catholics, 2 denoted Muslims and 3 denoted other religions	**D**
10	Variable 10	**Parents** 1 denoted the deceased having their parents alive and 2 denoted having lost any of the parents before completing suicide;	**D**
11	Variable 10A	If the parents were still alive, 1 denoted having regular contact with their living parents, 2 denoted having occasional contact and 3 denoted having no contact.	**D**
12	Variable 11	**Siblings** 1 denoted the deceased had any siblings and 2 denoted having no siblings or having lost their siblings;	**D**
13	Variable 11A	If the deceased had any living siblings 1 denoted having regular contact with their living siblings, 2 denoted having occasional contact and 3 denoted having no contact.	**D**

14	Variable 12	**Children** 1 denoted the deceased having living children and 2 denoted having no children or having lost their children before completing suicide;	**D**
15	Variable 12 A	If the deceased had any children alive; 1 denoted having regular contact with their living children, 2 denoted occasional contact and 3 denoted having no contact.	D
16	Variable 13	**Extended Family** 1 denoted regular contact with other family members, 2 denoted having occasional contact and 3 denoted having no contact.	**D**
17	Variable 14	**Friends** This variable was divided into two: having close friends of the same sex and another denotation for friends of the opposite sex. Both sub variables were denoted by 1 – having frequent contact and 2 - having infrequent contact.	**D**
18	Variable 14A	Having close friends of the opposite sex – 1 denoted frequent contact and 2 denoted having infrequent contact.	**D**

19	Variable 15	**Social affiliations** 1 denoted participation in local or national organisations, associations, clubs or groups and 2 denoted no social affiliations	**D**
	Variable 16	**Vices** Since a person may have had more than one vice, this variable was divided into 5: Smoking, Drinking, Gambling, Illicit substances and other vices; for each vice, 1 denoted having the indicated vice and 0 denoted not having the indicated vice.	**D**
20	Variable 16	Smoking	**D**
21	Variable 16A	Drinking	**D**
22	Variable 16B	Gambling	**D**
23	Variable 16C	Illicit Substance	**D**
24	Variable 16D	Other vices	**D**
25	Variable 17	**Date of death** The date of death was entered as figures for SPSS purposes	**D**

26	Variable 18	**Time of death** The time was entered in 24-hour format as figures for SPSS purposes	**D**
27	Variable 19	**Place of death** The locality in Malta was recorded using the LAU 2 format. (as in variable 8)	**D**
28	Variable 20	**Type of place of death** Eight classifications of places where suicides were reported: 1. Home 2. Private Garage 3. Public Area 4. Bastions 5. Cliffs 6. Bridge 7. Institution 8. Others	**D**
29	Variable 21	**Method of Death** The seven most commonly used methods of suicide and one general classification were denoted as follows: 1. Hanging 2. Jumping off heights	**D**

3. Use of firearms
4. Substance use
5. Carbon Monoxide poisoning
6. Drowning
7. Self-Stabbing
8. Others

30	Variable 22	**Planning vs Impulsivity** Where signs of planning were recorded, 1 was coded into SPSS. 2 denoted impulsiveness	**SB****
	Variable 23	**On suicide** Each classification was turned into a variable. Each of these variables had two codes as described below:	**SB**
31	Variable 23	*Self – Harm:* 1 denoted the presence of self-harm, 2 denoted an absence of self-harm.	**SB**
32	Variable 23A	*Suicide Ideation:* 1 denoted minimal suicidal ideation, 2 denoted an advanced stage of suicidal ideation.	**SB**
33	Variable 23B	*Desire to attempt:* 1 denoted a desire to attempt suicide, 2 denoted that no such desire existed.	**SB**
34	Variable 23C	*Planned to attempt:* 1 denoted an early stage of planning suicide, 2 denoted an extensive and advanced stage of planning to attempt suicide.	**SB**
35	Variable 23D	*Favourable attitude towards suicide:* 1 denoted a slight favourability towards suicide, 2 denoted a highly favourable attitude.	**SB**

36	Variable 23E	*Attraction to death:* 1 denoted an attraction to die, 2 denoted the absence of such attraction to death	**SB**
37	Variable 23F	*Decided but not attempted:* 1 denoted a favourable decision to attempt suicide, 2 denoted that such decision was not yet taken	**SB**
38	Variable 23G	*Prepared to attempt:* 1 denoted that the person was prepared to attempt suicide, 2 denoted that the person was not yet prepared to attempt.	**SB**
39	Variable 24	**Attempted before** 1 denoted that there was a previous suicide attempt and 2 denoted that there was no recorded attempt before.	**H*** **
40	Variable 25	**History of suicide in the family** 1 denoted that a family member attempted or died by suicide, 2 denoted that no family member ever attempted or died by suicide	**H**
41	Variable 26	**History of suicide by close friends** 1 denoted that a close friend of the deceased attempted or died by suicide, 2 denoted that no such instance was ever recorded	**H**

42	Variable 27	**Suicide Note** 1 denoted that a suicide note was found, 2 denoted that no suicide note was found. Where no record of either of the two instances was recorded, the value remained missing in the system	**SB**
43	Variable 28	**Last known action** The last activity of the deceased as known by the survivors was recorded	
44	Variable 29	**Employment** 1 denoted public service employment, 2 denoted private employment, 3 denoted self-employment, 4 denoted unemployment and 5 denoted retirement	**D**
45	Variable 30	**Income** 1 denoted that the income of the deceased was unknown, 2 denoted an income of less than €12,000, 2 denoted an income of less than €30,000 and 4 denoted an income of more €30,000	**D**
46	Variable 31	**Education** 1 denoted that the deceased had a compulsory school level, 2 denoted a higher education and 3 denoted a tertiary level of education	**D**

47	Variable 32	**Skills** 1 denoted having general skills, 2 denoted having specialised skills and 3 denoted having no skills	**D**
48	Variable 33	**Physical Disability** 1 denoted any physical disability that restricted movement, 2 denoted any disability that impaired movement, 3 denoted visual disability and 4 denoted aural disability	**D**
49	Variable 34	**Chronic Illness** 1 denoted that the deceased suffered from no chronic illness, 2 denoted diabetes was present, 3 denoted that the deceased suffered from blood hypertension, 4 from HIV or AIDS, 5 from digestive illnesses, 6 from pulmonary diseases, 7 from coronary diseases, 8 from dementia, 9 from Alzheimer's disease, 10 from Parkinson's disease and 11 from any other chronic illness.	**D**
50	Variable 35	**Mental Health** 1 denoted the deceased suffered from depression, 2 from hopelessness or ancillary issues, 3 from Bi-Polar disorder, 4 denoted the presence of any anxiety disorder, 5 denoted mood disorders, 6 denoted schizophrenia, 7 denoted personality disorders, 8 denoted sleeping disorders and 9 denoted the	**D**

		deceased suffered from any other mental health issue or had sought other psychiatric care.	
51	Variable 36	**Child Abuse** 1 denoted that the deceased suffered child abuse earlier in life, 2 denoted that the event happened immediately prior to death	**LE******
52	Variable 37	**Trauma or loss of function** 1 denoted that the deceased sustained a highly distressing experience or physical injury and suffered from the same experience for a long time. 2 denoted that this event happened shortly before suicide	**LE**
53	Variable 38	**Financial Difficulties** 1 denoted the presence of financial difficulties as a long-term event, 2 denoted that financial difficulties arose just before suicide	**LE**
54	Variable 39	**Loss of Employment** 1 denoted a history of unemployment, 2 denoted losing a job immediately prior to suicide.	**LE**

55	Variable 40	**Marriage or relationship breakdown** 1 denoted marriage or a relationship breakdown as happening earlier in life, 2 denoted that this event happened recently before suicide	**LE**
56	Variable 41	**Loss of child custody** 1 denoted losing a child's custody a long time before suicide, 2 denoted losing a child's custody just before completing suicide	**LE**
57	Variable 42	**Death of loved one** 1 denoted the demise or loss of a significant other long before the suicide, 2 denoted this event as happening just before suicide	**LE**
58	Variable 43	**Life threatening illness** 1 denoted living with a potentially fatal illness, 2 denoted suffering such tragic consequences just before completing suicide	**LE**
59	Variable 44	**Legal Problems** 1 denoted the deceased having long term legal problems, 2 denoted the deceased having recent legal problems before suicide	**LE**

60	Variable 45	**Criminality** 1 denoted the deceased having long term legal criminality problems, 2 denoted the deceased having recent criminal problems before suicide	**LE**
61	Variable 46	**Other Life Event** 1 denoted any other significant life event which happened in the past, 2 denoted any other significant life event which happened recently before suicide.	**LE**

*D = Demographic variable

**SB = Suicidal Ideation and behavioural variable

***H = History of suicide variable

****LE = Life Event variable

Appendix 2 – The Investigative Support Tool

Manuel Camilleri – Suicides in Malta

Name:		ID Card:	
Police Ref:		AG Ref:	

Demographics:

1	DOB:	_____/_____/_____		Age: _____
2	Gender:	☐M ☐F	3	Orientation: ☐Straight ☐LGBTIQ
4	Race:	☐ Caucasian ☐ Black ☐ Asian ☐ Arab Other_____		
5	Nationality:	_____		
6	Immigration status:	☐Natural born ☐Naturalised ☐ Illegal Immigrant Other _____		
7	Status:	☐Single Never Married ☐Single Other ☐Married (_____ Years) ☐Divorced/Annulled (_____Years) ☐Re- Married (_____ Years) ☐In a Relationship (_____ Years) Other info _____ _____		
8	Residence:	_____ ☐Southern Harbour ☐Northern Harbour ☐South Eastern ☐Western ☐Northern ☐Gozo		
9	Religion:	☐ Catholic ☐ Muslim ☐ Agnostic Other_____		
10	Family:	**Parents:** ☐ Living ☐ Regular Contact ☐Occasional Contact ☐ No contact ☐ Deceased Years before suicide: _____ Age when Mother died: _____ Age when Father died: _____		
11		**Siblings:** ☐ Living ☐ Regular Contact ☐Occasional Contact ☐ No contact ☐ Deceased Years before suicide:		
12		**Children:** _____Females _____Males Children sharing home : _____ Children living out of home: _____ ☐ Living ☐ Regular Contact ☐Occasional Contact ☐ No contact ☐ Deceased Years before suicide:		
13		**Extended:** ☐ Regular Contact ☐Occasional Contact ☐ No contact		
14	Friends:	Close Friends: Same sex: _____ Contact : ☐Frequent ☐Rare Opposite sex: _____ Contact : ☐Frequent ☐Rare _____ _____		
15		Social affiliations: ☐Yes ☐No _____ _____ _____		
16	Vices:	☐Smoking ☐Drinking ☐Gambling ☐Illicit Substances ☐Other/s _____ _____		

	Death:			
17	Date of Death:	_____/_____/_____	18	Time of Death: _____:_____
19	Place of Death:	_____		
20	Type of POD:	_____		
21	Method:	☐ Hanging ☐ Proper knot ☐ Improvised knot _____ _____		
		☐ Firearm ☐ Owned ☐ Obtained _____ _____		
		☐ Jumping ☐ Public ☐ Secluded _____ _____		
		☐ Substance ☐ Prescription ☐ Illicit _____ _____		
		☐ CO Poisoning ☐ Vehicle ☐ Other _____ _____		
		☐ Other _____ _____		
22	Planning:	☐ Planned _____ _____ _____		
		☐ Impulsive _____ _____ _____		
23	On Suicide:	**Self-Harm**: Type _____ Description _____ _____		
		Ideation: ☐ Minimal ☐ Advanced Description _____ _____		
		Desire to attempt: ☐ Yes ☐ No Description _____ _____		
		Planned to attempt: ☐ Early stage ☐ Advanced stage Description _____ _____		
		Favourable attitude: ☐ Somewhat ☐ Highly Description _____ _____		
		Attraction to death: ☐ Yes ☐ No Description _____ _____		

		Decided but not attempted: ☐ Yes ☐ No Description _____ _____
		Prepared to attempt: ☐ Yes ☐ No Description _____ _____
24		**Attempted before** ☐ Yes ☐ No If attempted state method: ☐ Hanging ☐ Firearm ☐ Jumping ☐ Substance ☐ CO Poison ☐ Other _____ _____ Description/ Other Info _____ _____ _____
25		**History of suicide by family:** ☐ Yes ☐ No Description/ Other Info _____ _____ _____
26		**History of suicide by close friends:** ☐ Yes ☐ No Description/ Other Info _____ _____ _____
27	Suicide Note:	☐ Yes ☐ No
28	Last known action:	_____ _____ _____

Employment:

29	Employment:	☐ Public	Years _____	☐ Self-Employed	Years _____
		☐ Private	Years _____	☐ Unemployed	Years _____
30	Income:	☐ Unknown	☐ <€12,000	☐ <€30,000	☐ >€30,000
31	Education:	☐ Compulsory	☐ Higher	☐ Tertiary	
32	Skills:	☐ General skills	☐ Specialised skills	☐ No skills	

Disability:

33	Physical Disability:	☐ Restricts Movement	☐ Impairs Movement	☐ Vision	☐ Hearing
34	Chronic illnesses:	☐ None	☐ Diabetes	☐ Hypertension	☐ HIV/Aids
		☐ Digestive	☐ Pulmonary	☐ Coronary	☐ Other
		☐ Dementia	☐ Alzheimer's	☐ Parkinson's	
		☐ Other degenerative or progressive disease _____			
		☐ Other chronic illness _____			

35	Mental Health:	☐ Depression ☐ Anxiety Disorders ☐ Personality Disorders ☐ Official Diagnosis:	☐ Hopelessness ☐ Mood Disorder	☐ Bi-Polar Disorder ☐ Schizophrenia ☐ Sleeping Disorders _____ _____ _____

Life Events:

36	☐ Child abuse	_____ _____ _____	☐ LTE* ☐ IPD**
37	☐ Trauma/Loss of function	_____ _____ _____	☐ LTE ☐ IPD
38	☐ Financial Difficulties	_____ _____ _____	☐ LTE ☐ IPD
39	☐ Loss of Employment	_____ _____ _____	☐ LTE ☐ IPD
40	☐ Marriage/Relationship breakdown	_____ _____ _____	☐ LTE ☐ IPD
41	☐ Loss of child custody	_____ _____ _____	☐ LTE ☐ IPD
42	☐ Death of loved one	_____ _____ _____	☐ LTE ☐ IPD
43	☐ Life-threatening illness	_____ _____ _____	☐ LTE ☐ IPD
44	☐ Legal Problems	_____ _____ _____	☐ LTE ☐ IPD
45	☐ Criminality	_____ _____ _____	☐ LTE ☐ IPD
46	☐ Other	_____ _____ _____	☐ LTE ☐ IPD

Onset of event: *Long term event **Immediately prior to death event

Appendix 3 – University Ethical Approval

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11 October 2016

TO WHOM IT MAY CONCERN

School Research Ethics Panel (SREP) Submission

Applicant Name:	**Manuel Camilleri (1474437)** **Postgraduate Researcher (PhD)** **School of Human and Health Sciences** **University of Huddersfield**
Research Project:	**"Suicide in Malta"**
Reference:	**SREP/2016/067**

I confirm that the above titled research project received ethical approval from the School of Human and Health Sciences Research Ethics Panel (SREP), University of Huddersfield on 23 August 2016.

I also confirm that indemnity for this project is covered by the insurance policy held by the University of Huddersfield, as it falls within the normal range of research activity.

Prof Rachel Armitage
Chair, School Research Ethics Panel (SREP)
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Appendix 4 – STROBE (Strengthening The Reporting of Observational Studies in Epidemiology) Checklist

A checklist of items that should be included in reports of observational studies. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

Section and Item	Item No.	Recommendation	Reported on Page No.
Title and Abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	5-7
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	5-7
Introduction			
Background/ Rationale	2	Explain the scientific background and rationale for the investigation being reported	104 – 105
Objectives	3	State specific objectives, including any prespecified hypotheses	107 – 110
Methods			
Study Design	4	Present key elements of study design early in the paper	114 – 115
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	115 – 140
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	N/A N/A 115
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	N/A N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	122, 138 - 140

Section and Item	Item No.	Recommendation	Reported on Page No.
Data Sources/ Measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	122 – 136
Bias	9	Describe any efforts to address potential sources of bias	140
Study Size	10	Explain how the study size was arrived at	115
Quantitative Variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	122 – 136
Statistical Methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	112 – 114
		(*b*) Describe any methods used to examine subgroups and interactions	139
		(c) Explain how missing data were addressed	138 – 141
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	N/A N/A 115 – 121
		(e) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	142
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive Data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	142 – 162
		(b) Indicate number of participants with missing data for each variable of interest	142 – 214
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	N/A
Outcome Data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	N/A
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	N/A
		Cross-sectional study—Report numbers of outcome events or summary measures	N/A

Section and Item	Item No.	Recommendation	Reported on Page No.
Main Results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	142 - 214
		(b) Report category boundaries when continuous variables were categorized	N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other Analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	201 – 214
Discussion			
Key Results	18	Summarise key results with reference to study objectives	227 – 238
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	217 - 218, 246 – 248
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	227 – 246
Generalisability	21	Discuss the generalisability (external validity) of the study results	248 – 260
Other Information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	3

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.